Health Canada and the Public Health Agency of Canada
Santé Canada et l'Agence de la santé publique du Canada
Canada

Evaluation of Emergency Preparedness and Response Activities 2012-13 to 2016-17

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List of Acronyms

AAR	After-Action Review
AERO	All-Events Response Operations
AHRCA	All-Hazards Risk and Capability Assessment
AIR	After-Incident Review
CEPR	Centre for Emergency Preparedness and Response
CFEZID	Centre for Food-borne, Environmental, Zoonotic and Infectious Diseases
CFIA	Canadian Food Inspection Agency
CIRID	Centre for Immunization and Respiratory Infectious Diseases
CPAB	Communications and Public Affairs Branch
CSB	Corporate Services Branch
EMS	Emergency Management System
EPR	Emergency Preparedness and Response
GPHIN	Global Public Health Intelligence Network
HP ERP	Health Portfolio Emergency Response Plan
HP SEMP	Health Portfolio Strategic Emergency Management Plan
HPOC	Health Portfolio Operations Centre
HSIB	Health Security Infrastructure Branch
ICS	Incident Command System
IMS	Incident Management Structure
IHR	*International Health Regulations*
LIMS	Laboratory Information Management System
MERS CoV	Middle East Respiratory Syndrome Coronavirus
MERT	Microbiological Emergency Response Team
MOOC	Medical Officer On-Call
NESS	National Emergency Strategic Stockpile
NML	National Microbiological Laboratory
NML EOC	National Microbiological Laboratory Emergency Operations Centre
OFMAR	Operational Framework for Mutual Aid Requests
PHAC	Public Health Agency of Canada
RECC	Regional Emergency Coordination Centre
SARS	Severe Acute Respiratory System
WHO	World Health Organization

Executive Summary

Evaluation Purpose and Scope

This evaluation assesses the emergency preparedness and response activities (also called program) undertaken by the Public Health Agency of Canada (PHAC) between 2012-13 and 2016-17. It examined the relevance of these activities to Canadians, the achievement of intended goals and the efficiency of emergency management within PHAC.

The evaluation focussed on PHAC's emergency management activities as outlined below. These activities are supported by the National Microbiological Laboratory (NML) and Regional Operations. Many other centres across the Agency and Health Canada also have activities that relate to public health event response. However, as this evaluation is primarily concerned with emergency management activities, the technical expertise provided by other centres within PHAC and Health Canada was not examined. The activities of other centres have been and will continue to be covered in separate evaluations.

Program Description

This program is responsible for strengthening Canada's capacity to prevent, mitigate, prepare for, and respond, to public health events and emergencies, as well as public health preparedness for mass gathering and high-profile events. The Centre for Emergency Preparedness and Response (CEPR) is within the Health Security and Infrastructure Branch (HSIB). It provides PHAC and Health Canada shared services of emergency management governance, emergency management plans, exercise and training, operations centres, field mobilizations, as well as lessons learned and risk and capability assessments. CEPR also provides a shared service in support of the deployment of subject matter experts from PHAC (e.g., infectious disease outbreaks, biological events) and Health Canada (e.g., chemical, radio-nuclear events, management of public health events affecting members of First Nations on-reserve). While not part of the shared services agreement for emergency preparedness and response, CEPR also maintains programming key to event detection and information sharing (the Global Public Health Intelligence Network (GPHIN) and the *International Health Regulations* (IHR) national focal point for Canada), and the National Emergency Strategic Stockpile which provides emergency health and social service supplies to provinces and territories when requested.

The NML contributes to the Agency's emergency preparedness and response activities by maintaining an Emergency Operations Centre to facilitate response activities, and a deployable laboratory with Microbiological Emergency Response Teams (MERT) to quickly deploy across Canada or abroad. The NML contributes science leadership and laboratory expertise for a wide range of emergency preparedness and response activities. However, for the purposes of this evaluation, only NML activities linked to the Centre for Emergency Preparedness and Response were considered. Regional Operations maintain Regional Emergency Coordination Centres (RECC) to liaise with provincial and territorial governments when not active, and to coordinate efforts with CEPR during an event.

Conclusions – Relevance

There is a need for the Health Portfolio to maintain and enhance emergency preparedness and response activities, based on the ever-evolving risk landscape of threats to Canadians' health and considering factors such as globalization and climate change. Public health events are occurring more frequently and their impact is intensifying due to increased urbanization, infrastructure dependencies and movement of goods and people.

Emergency preparedness and response is a core federal government responsibility clearly articulated in several key documents, such as the *Emergency Management Act* and the *Federal Policy for Emergency Management*. Activities also align broadly with key Government of Canada priorities. In the Health Portfolio, PHAC is responsible for providing the majority of services that fulfill an emergency preparedness and response (EPR) role.

Key informants reported clarified roles and responsibilities as a result of PHAC assuming responsibility for the shared service EPR function for PHAC and Health Canada. However, a review of lessons learned documents and interviews with internal stakeholders indicated some confusion regarding who within the organization should be undertaking specific tasks.

Furthermore, there have been enduring questions regarding the Health Portfolio's continued role in responding to emergency social service events (such as assisting in response to wildfires) and international events (events that take place outside Canada with limited immediate domestic implications). PHAC continues to play a role in these areas, in some form or another, despite the substantial contribution of non-governmental organizations (e.g., Canadian Red Cross, Médecins Sans Frontières Canada) and unclear international program authorities.

Conclusions – Performance

PHAC's emergency operations centres have been in a recurrent state of activation in response to 24 discrete events over the evaluation period. The Health Portfolio Operations Centre (HPOC) was activated for 10 events for a total of 1,067 days of emergency response, which varied in both duration and intensity of required effort. Often, the operations centres at the NML and in the regions were activated for the same events as the HPOC; however, they were also activated for local public health events or those with specific laboratory requirements. Partners (provinces and territories, as well as other government departments) have voiced their appreciation for this level of effort and support when preparing for and responding to public health events and emergencies. They were generally satisfied with the Agency's performance in this area.

The Centre for Emergency Preparedness and Response (CEPR), as the coordinating centre for emergency management activities, is aware that a necessary focus on event response has impacted progress in areas of response preparedness. Surge capacity to respond to extended or multiple events continues to be of great concern to both internal and external key informants, including the scaling-up at the start of the event as well as areas of public health concern that may arise after the initial event. Information flow deficiencies (e.g., disparate email platforms, paper-based systems, activities tracked through spreadsheets) hindered staff responding to events, particularly those in the regions, both before and during a response. Limited documentation on events has been collected and maintained for performance measurement and lessons learned reviews. Finally, event reviews have not been conducted in a timely fashion, limiting the impact of lessons learned by relevant programs to improve preparedness and response activities.

CEPR is aware of these challenges and has developed plans to enhance preparedness and response activities. The implementation of these plans should ensure a more effective and efficient response to public health events in the future.

Recommendations

Recommendation 1: Promote a whole of Portfolio[i] engagement approach to support emergency preparedness and response.

Large or protracted events require the mobilization of many employees to serve in an incident management structure and at times in field mobilizations. The evaluation noted that there were no issues raised regarding the Agency's capacity to mobilize sufficient numbers of employees to support previous long and frequent activations; however, there were concerns that mobilized employees could burn out and event responses would suffer should this pattern of activation continue. This was one of the key risks identified in PHAC's Corporate Risk Profile.

Emergency preparedness is a part of the Agency's core foundational mandate. Developing and reinforcing this understanding among staff and management will facilitate mobilizations by enlarging the roster of employees prepared for them. Managerial obstacles may also be overcome by supporting management who operate with a reduced staff complement as a result of mobilization, or by reviewing corporate priorities through a coordinated process during intense activations.

Recommendation 2: Implement the mobilization strategy.

PHAC has recognized the need to broaden the pool of appropriately skilled employees available to serve during responses, considering the potential for multiple and prolonged events and emergencies, and has undertaken considerable work to develop a strategy to address this.

[i] For the purposes of this evaluation the Health Portfolio is limited to PHAC and Health Canada.

Implementation of a mobilization strategy is in early stages; however, it is expected that a fully implemented strategy will help develop a more diverse roster of individuals to serve in an Incident Management Structure (IMS) and field mobilizations. It will also help identify individuals with the required skills, training and certifications to serve in specific functions (e.g., laboratory, procurement, policy, emergency management, public health, border health, epidemiologists) and focus on these groups of individuals. Furthermore, it will ensure that staff who are willing to be mobilized are adequately trained prior to deployment, should an event or emergency arise.

Recommendation 3: Review relevant plans, protocols and governance documents to ensure clarity in roles and feasibility of responsibilities for emergency preparedness functions.

Emergency preparedness activities are supported by several governance and planning documents (Health Portfolio Strategic Emergency Management Plan, Health Portfolio Emergency Response Plan, Health Portfolio Concept of Operations, Lessons Learned Plan, and Training Plan). Decisions regarding preparedness planning and event response are made according to these established protocols; however, the evaluation noted that documentation regarding these decisions was not readily available.

As the coordinating lead for emergency preparedness and response activities within the Health Portfolio, the Centre for Emergency Preparedness and Response should consider reviewing these documents to ensure the data collection requirements are feasible and that they clearly articulate the point of responsibility for the collection and maintenance of information to be captured, including activation, deactivation and other decision points, and to whom and in what forum this information should be shared.

Recommendation 4: Implement and maintain an All-Hazards Risk and Capability Assessment process.

Risk-based evidence is crucial for timely, effective decision-making and appropriate resource allocation. The Agency's emergency planning activities currently reflect a risk assessment model that is dated and does not include an understanding of the capabilities of the Agency or others who respond to health events and emergencies (e.g., provincial and territorial governments, other government departments, non-governmental organizations).

An updated and completed All-Hazards Risk and Capability Assessment would support several critical emergency preparedness and response activities (e.g., continued modernisation of the National Emergency Strategic Stockpile, timely acquisition of specialized medical countermeasures, development of just-in-time technical training programs, enhancement of provincial relations). Although there has been some progress toward an All-Hazards Risk and Capability Assessment, it is behind schedule. The Centre for Emergency Preparedness and Response should ensure that the process to develop the All-Hazards Risk and Capability Assessment is feasible and that assessments for both risk and capability are undertaken in a timely fashion and updated appropriately.

Recommendation 5: Ensure lessons-learned reviews for Health Portfolio-related events and exercises are undertaken in a timely fashion and proportionate to the complexity and size of the public health event or exercise.

Continuous improvement is a fundamental principle and key component of efficient and effective emergency management. The lessons learned approach is standard for emergency preparedness and response activities; however, the evaluation found inconsistencies in the collection, analysis and reporting of lessons learned following exercises and events, leading to similar shortcomings being experienced across multiple activations. Furthermore, when completed, the findings and recommendations were neither broadly shared, nor approved at the appropriate level for strategic consideration.

The Centre for Emergency Preparedness and Response has recently developed a revised, comprehensive process that should guide future lessons-learned activities. This process should be reviewed to ensure that it can be implemented as planned, that, when appropriate, it takes into consideration lessons learned from the National Microbiological Laboratory Emergency Operations Centre and Regional Emergency Coordination Centres, and that results are communicated broadly.

Recommendation 6: Ensure that the purpose of the IM and IT platforms is clear and addresses current and anticipated needs.

There are currently three information management platforms (the All-Events Response Operations application, the Laboratory Information Management System, and the Emergency Management System) used within PHAC to support the emergency preparedness and response function. Each platform is independent, but similar information is collected by all three systems. This duplication presents complications when seeking an authoritative source of data for planning and reporting purposes. Although some duplicate information is collected, key informants indicated that these platforms have the capacity to perform unique functions.

PHAC should review platform requirements, both current and anticipated, and implement these with a clear understanding of their purpose, how these systems will be synchronized and which system will serve as the authoritative source for reporting purposes for each identified requirement.

Management Response and Action Plan

Evaluation of Emergency Preparedness and Response Activities 2012-2013 to 2016-2017

Recommendations	Response	Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Recommendation as stated in the evaluation report	Identify whether program management agrees, agrees with conditions, or disagrees with the recommendation, and why	Identify what action(s) program management will take to address the recommendation	Identify key deliverables	Identify timeline for implementation of each deliverable	Identify Senior Management and Executive (DG and ADM level) accountable for the implementation of each deliverable	Describe the human and/or financial resources required to complete recommendation, including the source of resources (additional vs. existing budget)
Promote a whole of Portfolio engagement approach to support emergency preparedness and response.	Management supports this recommendation, as successful emergency preparedness and response activities are dependent not only on the timely availability of appropriately trained staff from a variety of disciplines, but on the support of programs and all levels of management for their participation. This support includes encouraging staff to participate in training and exercises to gain experience, ensuring willing staff are afforded the opportunity to support activations, and evaluating competing	Health Security Infrastructure Branch will continue to increase awareness of the roles and responsibilities of all of Health Canada and the Public Health Agency in preparing for and responding to events and emergencies that pose a risk to the health of Canadians.	Develop a portfolio framework that maps Emergency Preparedness and Response activities / capacities across the Health portfolio Identify Branch Event Response Coordinators to support the identification and recruitment of appropriate staff for mobilizations across PHAC. Review and provide recommendations to Executive Committees on renewal of EPR governance across the portfolio.	October 2019 March 2018 March 2019	Health Portfolio Emergency Preparedness Committee DG-CEPR; VP-HSIB Health Portfolio Emergency Preparedness Committee	Tasks to be addressed through reallocation of existing resources.

Recommendations	Response	Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Recommendation as stated in the evaluation report	Identify whether program management agrees, agrees with conditions, or disagrees with the recommendation, and why	Identify what action(s) program management will take to address the recommendation	Identify key deliverables	Identify timeline for implementation of each deliverable	Identify Senior Management and Executive (DG and ADM level) accountable for the implementation of each deliverable	Describe the human and/or financial resources required to complete recommendation, including the source of resources (additional vs. existing budget)
	portfolio priorities in times of heightened or multiple responses, to ensure appropriate resources are available to support both operational continuity and the active protection of the health of Canadians in response to a public health threat or emergency.					
Implement the mobilization strategy.	Management supports this recommendation and has committed, as part of Branch annual program performance indicators, to implement a comprehensive mobilization strategy.	Develop implementation plan with key activities and milestones.	Complete the implementation of the AERO database. Implement new competency-based mobilization training program.	March 2019 March 2019	DG-CEPR; VP-HSIB DG-CEPR; VP-HSIB	For all activities related to this recommendation 1 PM-04 $15K O&M + additional resources identified through internal realignment resulting from Branch reorganisation
Review relevant plans, protocols and governance to ensure clarity in roles and feasibility of responsibilities for emergency preparedness	Management agrees with the recommendation and acknowledges the need to ensure that documentation supporting activations and responses more	Evaluate response documentation to ensure that it is appropriate for both facilitation and recording of decision making, and promote consistent use.	Development of Incident Management System (IMS) guidance to outline necessary information for internal decision-making and ensure	March 2019	DG-CEPR; VP-HSIB Governance - Health Portfolio Emergency Preparedness Committee	

Recommendations	Response	Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Recommendation as stated in the evaluation report	Identify whether program management agrees, agrees with conditions, or disagrees with the recommendation, and why	Identify what action(s) program management will take to address the recommendation	Identify key deliverables	Identify timeline for implementation of each deliverable	Identify Senior Management and Executive (DG and ADM level) accountable for the implementation of each deliverable	Describe the human and/or financial resources required to complete recommendation, including the source of resources (additional vs. existing budget)
functions.	effectively captures decisions made and action taken in response to public health events. It is further acknowledged that plans should be assessed on a regular basis to assure that they remain current and appropriate for the changing nature of risk environment.		appropriate documentation and sharing of decisions and actions. Mindful of Government Operations Centre review and Public Safety's evolving Emergency Management Strategy, review the Health Portfolio Emergency Response Plan (HPERP). Revise and update HPERP as required, aligning with the revised FERP and current organisational structures, roles and responsibilities.	 September 2019 March 2020		
Implement and maintain an *All Hazards Risk and Capability Assessment*	Management supports the recommendation to implement an All Hazards Risk and Capability Assessment	Implement all hazards Risk and Capability assessment process.	Conduct annual workshop with EM, technical and SM experts focussing on initial set of identified	Conduct year 1 workshop March 2018	DG-CEPR; VP-HSIB	For all activities related to this recommendation 1.5 FTE through internal reallocation / risk management.

Recommendations	Response	Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Recommendation as stated in the evaluation report	Identify whether program management agrees, agrees with conditions, or disagrees with the recommendation, and why	Identify what action(s) program management will take to address the recommendation	Identify key deliverables	Identify timeline for implementation of each deliverable	Identify Senior Management and Executive (DG and ADM level) accountable for the implementation of each deliverable	Describe the human and/or financial resources required to complete recommendation, including the source of resources (additional vs. existing budget)
process.	process for the portfolio, and has committed as part of program performance indicators to complete a full assessment on a 5-year basis, recognising that this is an identified gap in program and attempts to strengthen it will require incremental funding.		risks and identification of available HP capabilities. Issue Annual Reports. Provide performance measurement as part of PIP annual reporting against 5 year cycle.	 Initial Annual Report December 2018 Annual reporting against 5 year cycle March 2019.		1 PM-05 0.5 EC-06
Ensure lessons-learned reviews for Health Portfolio-related events and exercises are undertaken in a timely fashion and proportionate to the public health event/exercise complexity and size.	Management agrees with recommendations to ensure lessons learned exercises are timely and that findings are distributed and implemented appropriately. Management further agrees that the recently developed process should be reviewed to	Undertake a review of the revised LL process to validate both the appropriateness of the process and resources required to consistently undertake timely reviews of HP responses and exercises.	Develop process for disseminating lessons learned products from events and exercises to senior executives. Conduct a review of the process for Lessons Learned. Validate findings of review and any	October 2018 March 2019 May 2019	DG-CEPR; VP-HSIB Governance - Health Portfolio Emergency Preparedness Committee	For all activities related to this recommendation 2 FTE reallocation from existing resources 1 x PM-05 1 PM-03

Recommendations	Response	Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Recommendation as stated in the evaluation report	Identify whether program management agrees, agrees with conditions, or disagrees with the recommendation, and why	Identify what action(s) program management will take to address the recommendation	Identify key deliverables	Identify timeline for implementation of each deliverable	Identify Senior Management and Executive (DG and ADM level) accountable for the implementation of each deliverable	Describe the human and/or financial resources required to complete recommendation, including the source of resources (additional vs. existing budget)
	ensure appropriate implementation and resourcing, with consideration to work ongoing at NML and within Regional response centres.	Reallocate resources to support the revised LL process and assess and report on implementation.	resulting recommendations through established governance structure. Issue quarterly and annual reports through established governance.	Quarterly reports issued by the end of each quarter. Annual report March 2019 Performance measurement info provided for PIP by end of FY.		
Ensure that the purpose of the respective IM IT platforms is clear and addresses current and anticipated needs.	Management acknowledges the importance of stronger engagement across the portfolio prior to development of any new IMIT systems for EP&R, or major upgrades to existing systems to ensure program needs are met. This will help to minimise the risk of	Map current EPR IM Systems and validate through existing governance.	Develop visual map of systems for EPR IM (including templates, document repositories, EM HR and training reporting systems etc). • Consult HPEPC on: validation of Systems Map, • new EPR IM	July 2018 As required.	DG-CEPR; VP-HSIB Governance - Health Portfolio Emergency Preparedness Committee	Reallocation of existing resources.

Recommendations	Response	Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Recommendation as stated in the evaluation report	Identify whether program management agrees, agrees with conditions, or disagrees with the recommendation, and why	Identify what action(s) program management will take to address the recommendation	Identify key deliverables	Identify timeline for implementation of each deliverable	Identify Senior Management and Executive (DG and ADM level) accountable for the implementation of each deliverable	Describe the human and/or financial resources required to complete recommendation, including the source of resources (additional vs. existing budget)
	duplication and increase opportunities to share timely, relevant and complete data both within the portfolio and with key partners and stakeholders. Management agrees that the development of parallel information management platforms (EMS (now OCIP), LIMS and AERO) for EP&R, and particularly for documentation of training and mobilisation data has led, at times to duplication of information, and a lack of clarity over which system is the authoritative source for Agency data. Noting this, management agrees that a review of current systems to establish		systems, and • significant proposed changes to existing systems, prior to implementation.			

Recommendations	Response	Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Recommendation as stated in the evaluation report	Identify whether program management agrees, agrees with conditions, or disagrees with the recommendation, and why	Identify what action(s) program management will take to address the recommendation	Identify key deliverables	Identify timeline for implementation of each deliverable	Identify Senior Management and Executive (DG and ADM level) accountable for the implementation of each deliverable	Describe the human and/or financial resources required to complete recommendation, including the source of resources (additional vs. existing budget)
	clear roles and purposes for each platform is necessary to streamline information management moving forward.					

1.0 Evaluation Purpose

This evaluation examined the emergency preparedness and response activities undertaken by the Public Health Agency of Canada (PHAC) between 2012-2013 and 2016-2017. It examined the relevance of these activities to Canadians, the achievement of intended goals and the efficiency of emergency management within PHAC.

The evaluation examined the Health Portfolio's [ii] activities in emergency management governance, emergency response plans, operations centres, field mobilizations, as well as training and exercises. It focussed on emergency preparedness and response activities undertaken by the Centre for Emergency Preparedness and Response. It also included activities of the National Microbiological Laboratory's Emergency Operations Centre and the Regional Emergency Coordination Centres.

The Centre for Emergency Preparedness and Response (CEPR), National Microbiology Laboratory (NML) and Regional Operations undertake many activities but the evaluation examined only those that support Canada's emergency preparedness and response system. The broader activities of the NML and Regional Operations were not assessed.

The evaluation also did not examine PHAC's or Health Canada's technical expertise to respond to events. Technical expertise refers to activities not directly related to preparedness, response, and management functions, such as surveillance or epidemiological activities, infection prevention and control to support provincial and territorial outbreaks, and radiological and nuclear response preparedness. Supporting activities undertaken by the Infectious Disease Prevention and Control Branch or in other areas of the Agency, as well as those undertaken by Health Canada (Radiation Protection Bureau, the Chemical Emergency Preparedness and Response Unit, the First Nations and Inuit Health Branch, and the Therapeutic Products Directorate) have been covered under previous evaluations. This evaluation, therefore, focussed on the assessment of PHAC's emergency management activities.

2.0 Program Description

2.1 Program Context

Preparing for, and responding to emergencies is a shared responsibility among all three levels of government (federal, provincial and territorial, municipal), with contributions from non-governmental public health partners. The Health Security Infrastructure Branch (HSIB) is the central coordination point on health security matters, and is the lead for Emergency Preparedness and Response (EPR) for PHAC and Health Canada (the Health Portfolio).

[ii] For the purposes of this evaluation the Health Portfolio is limited to PHAC and Health Canada. In addition to PHAC and Health Canada, the broader Health Portfolio includes the Canadian Food Inspection Agency (which undertakes its own emergency preparedness and response activities not covered in this evaluation), as well as the Patented Medicine Prices Review Board and the Canadian Institutes of Health Research (neither of which have EPR responsibilities).

HSIB is supported in these activities by the National Microbiological Laboratory (NML) and Regional Operations. This program is responsible for strengthening Canada's capacity to help prevent, mitigate, prepare for, and respond to, public health events and emergencies.

2.2 Program Profile

The Centre for Emergency Preparedness and Response (CEPR) within HSIB provides PHAC and Health Canada shared services for emergency management governance, emergency management plans, exercise and training, an operations centre, field mobilizations, lessons learned, and risk and capability assessments. It also supports other emergency preparedness and response activities, such as the National Emergency Strategic Stockpile, key programming related to event detection and information sharing, including the Global Public Health Intelligence Network (GPHIN) and the *International Health Regulations* (IHR) national focal point for Canada, subject matter experts at PHAC for infectious disease outbreaks, biological events and national emergency stockpiles, as well as at Health Canada for chemical, radio-nuclear events, and management of events with public health implications for members of First Nations on-reserve[iii].

The program coordinates federal, and as required, provincial and territorial responses to public health threats posed by natural or man-made events, as well as public health preparedness for mass gathering and high-profile events. The National Microbiological Laboratory (NML), through their Emergency Operations Centre and the Microbiological Emergency Response Teams (MERT), and Regional Operations, through the Regional Emergency Coordination Centre, also support efforts in this area.

CEPR's activities also enable the Minister of Health to meet obligations under the *Emergency Management Act* and *International Health Regulations* (IHR) by coordinating the Agency's resources in preparation for, and in response to health security risks, events and emergencies.

2.2.1 Centre for Emergency Preparedness & Response

CEPR sits within HSIB and is Canada's central coordinating point for public health security issues. Among its many responsibilities, CEPR develops and maintains national emergency response plans for PHAC and Health Canada. It monitors outbreaks and global disease events, assesses public health risks during events and emergencies, and contributes to aligning Canada's health and emergency policies with evolving threats to public health security. It maintains general health security for Canadians, in collaboration with other federal and international health and security agencies.

[iii] In 2017, the First Nations and Inuit Health Branch was formally transferred from Health Canada to the newly created Indigenous Services Canada. This change did not impact the results of this evaluation as it occurred after the evaluation period.

2.2.2 Regional Operations

PHAC maintains Regional Emergency Coordination Centres (RECC) in six locations across the country: Western (British Columbia and Alberta), Manitoba and Saskatchewan, Ontario, Quebec, Atlantic (New Brunswick, Newfoundland, Nova Scotia, and Prince Edward Island) and Northern (Northwest Territories, Yukon and Nunavut). The role of the RECCs is to coordinate the Health Portfolio's response to an event in a particular region. This involves providing situational awareness to the Health Portfolio Operations Centre (HPOC) and regional stakeholders, supporting Health Portfolio programs in their regional response activities, tracking and supporting the needs of any Health Portfolio resources that are deployed to the region, and briefing regional Health Portfolio Executives. Depending on the type and scope of the RECC's involvement, this coordination can be done through the presence of a complement of resources within a RECC, or through the establishment of a regional liaison role.

2.2.3 National Microbiological Laboratory's Emergency Operations Centre

PHAC's National Microbiology Laboratory provides Canada with the facilities to study the most dangerous and contagious disease-causing agents (level 3 and 4 pathogens) and the national diagnostic capacity to detect and respond quickly in the event of a disease outbreak. Integrated within Canada's emergency preparedness and response readiness strategies, the National Microbiological Laboratory's Emergency Operations Centre (NML-EOC) is PHAC's scientific point of coordination for emergency response and day-to-day communications in the area of infectious disease. The NML-EOC works with the Canadian Public Health Laboratory Network to coordinate the national public health laboratory response. The NML also provides scientific and mobile laboratory support for field investigations aimed at controlling outbreaks and potential threats domestically and in support of international partners. The NML's Microbiological Emergency Response Team (MERT) can provide biological response capabilities to anywhere in the world. For the purposes of this evaluation, only NML activities linked to the Centre for Emergency Preparedness and Response were considered.

2.3 Previous Evaluations

Emergency preparedness and response activities have never been evaluated in their entirety. However, the National Emergency Strategic Stockpile (NESS) was evaluated in 2011-12 and there have been several reviews of PHAC's responses to large-scale events such as Ebola and H1N1. In June 2010, an audit of PHAC's EPR program revealed a need to:

- articulate, document and clearly communicate the EPR mandate, strategies, operational goals and plans, and roles and responsibilities;
- develop a long-term and comprehensive risk and threat assessment process, and an "all-hazards" risk management plan addressing legislated emergency preparedness and response obligations;
- develop surge capacity models and provide mandatory emergency management training to maintain a qualified response capacity; and
- manage and deploy assets with efficiency, effectiveness, and timeliness.

2.4 Program Narrative

The overall goal of the EPR program is to protect Canadians from public health threats. This plays an important role in the Agency's outcome of protecting Canadians and empowering them to improve their health. Three main activity areas lead to the achievement of this outcome:

- preparation for events and emergencies through planning, training, and exercises;
- detection of potential events through situational awareness and risk assessment; and
- response to events and emergencies through emergency management and resource mobilization.

It is expected that these activities will enhance stakeholders' knowledge and resources to prepare for, and respond to, public health threats and events or emergencies and ensure that Canada has mechanisms in place to enable effective responses to public health threats and events or emergencies. Ultimately, this will contribute to Canada's capacity to prepare for and respond to public health events and emergencies.

The connection between the program activity areas and the expected outcomes is depicted in the program logic model (see Appendix 1). The evaluation assessed the degree to which the defined outputs and outcomes have been achieved.

2.5 Program Alignment and Financial Resources

Emergency Preparedness and Response, together with the Border Health Security and Biosecurity programs, make up PHAC's Health Security program.

Table 1 presents the program's financial data for the years 2012-13 through 2016-17. Overall, PHAC planned spending was $229 million over five years on EPR-related activities that are covered within this evaluation.

Table 1 Program Financial Resources ($M)

Year	Gs & Cs[a]	O&M	Salary[b]	Capital	Statutory[c]	Total
2012-13	1.7	36.1	12.2	0.5	n/a	**50.5**
2013-14	n/a	24	11.2	0.5	n/a	**35.7**
2014-15	n/a	22.6	13.7	0.5	2.2	**38.9**
2015-16	n/a	26.6	16.9	0.5	n/a	**43.9**
2016-17	n/a	42.7	17.2	0.5	n/a	**60.4**
Total	**1.7**	**151.9**	**71.2**	**2.4**	**2.2**	**229.4**

Planned spending data from the Departmental Plan: Public Health Agency of Canada (formerly Report on Plans and Priorities)

[a] Grants and Contributions – transfer to CIHR for the Influenza Research Network

[b] Salary also includes the employee benefit program

[c] Statutory is a spending authority, in this case related to the NESS, including the proceeds from the disposal of capital assets

3.0 Evaluation Description

3.1 Evaluation Scope, Approach and Design

Issues covered by this evaluation are aligned with the Treasury Board of Canada's *Policy on Results* (2016) and included an assessment of relevance, effectiveness and efficiency. The evaluation process was guided by consideration of the core issues, as well as specific questions developed in consultation with the program.

An outcomes-based approach was used to conduct the evaluation in order to assess what progress was made toward the achievement of expected outcomes, whether there were any unintended consequences, and what lessons were learned.

Corresponding to these issues, specific questions were developed based on management considerations and these guided the evaluation process.

Data for the evaluation were collected using various methods, including:

- document review;
- key informant interviews;
- financial data review; and
- performance measurement data review.

More specific details on data collection and analysis methods are included in Appendix 2. Data were analyzed by triangulating information gathered from the different methods listed above. The use of multiple lines of evidence and triangulation was intended to increase the reliability and credibility of the evaluation findings and conclusions.

3.2 Limitations and Mitigation Strategies

Evaluations face constraints that have implications for the validity and reliability of findings and conclusions. The following table outlines the limitations in methods selected for this evaluation. Also noted are the anticipated impacts and mitigation strategies to ensure evaluation findings may be confidently used to guide program planning and decision-making.

Table 2 Limitations and Mitigation Strategies

Limitation	Impact	Mitigation Strategy
Inconsistent collection of performance information.	It was not possible to present a whole picture of all EPR activities.	Results were presented to the fullest extent possible in disaggregated form. Implementation of recommendations (mobilization strategy, clarity of EPR platforms) should facilitate this data collection in the future.
Detailed information (e.g., activities, mobilized resources, outcomes) regarding individual events was not available.	It was difficult to assess the program's impact on the outcome of an event, and the impact of the event on the organization. It was not possible to quantify the effectiveness of response activities.	Evaluation relied on information from stakeholders to determine program's impact and effectiveness of response, and where available, used limited documented information to triangulate these perceptions.
Unclear link between short-term outcomes and long-term outcomes.	It was not possible to examine the progression from activities to short-term outcomes to long-term outcomes.	The impact of program activities on short-term outcomes was assessed independently from the impact of program activities on long-term outcomes.
Detailed financial information was disaggregated by Centre and not by event response. Limited financial information disaggregated by event or response was only available for recent activities.	It was not possible to conduct a quantitative analysis of efficiency of particular activities in this area, or the response to particular events.	Evaluation relied triangulation of information from stakeholders and document review to assess efficiency. Implementation of recommendations (better tracking of event information) should facilitate this data collection in the future.

4.0 Findings

4.1 Relevance: Continued Need for the Program

Due to the ever-evolving risk landscape of threats to Canadians' health, there is a continued need for PHAC to have a federal public health role in this area.

The Public Health Agency of Canada was established in 2004 to improve federal leadership and inter-governmental collaboration in response to recommendations[1] following a review of

Canada's response to an emerging viral illness previously unknown in Canada: Severe Acute Respiratory Syndrome (SARS).

In addition to monitoring, preparing for and responding to biological events that may threaten the health of Canadians, PHAC has a responsibility to prepare for and respond to non-biological events that may have public health consequences These include natural disasters (e.g., floods, fires), mass gatherings (e.g., world summits, sporting events), accidental events (e.g., train derailment), and intentional events (e.g., terrorism).

The ever-evolving risk landscape of threats to Canadians' health requires continuous emergency preparedness and response activities. Current pressures on EPR activities include continued globalisation, climate change and threats from external actors, including:

- Increased mobility of Canadians to other countries, as well as visitors and immigrants to Canada, threaten to spread diseases further from their sites of origin.
- Changes to the global climate have potential to impact Canadian's health both directly and indirectly. Increasing global temperatures have contributed to Canadians' risk of exposure to new or re-emerging diseases such as Lyme disease, locally contracted malaria and Zika virus[2]. Extreme weather events can also threaten the health of Canadians (e.g., hotter and prolonged period of heat, summer storms contaminating drinking water) and can contribute to natural disasters (e.g., wildfires, storms, flooding[3]).
- Concerns regarding a heightened risk of intentional events with public health implications have increased as violent extremists have more frequently sought to cause mass casualties on civilian populations.

4.2 Relevance: Alignment with Government Priorities

CEPR and partners support the Health Portfolio's mandate as well as broader government priorities by preparing for, and responding to, these events.

The Government of Canada supports protecting the health and security of Canadians and their families. For example, the 2010[4], 2011[5], 2013[6], and 2015[7] Speeches from the Throne outlined the Government's commitment to protecting the personal safety of Canadians and defending them against threats to national security.

Canada's annual budget has consistently supported emergency preparedness and response (EPR) activities. Budgets 2014[8], 2015[9] and 2016[10] included several immediate measures to support the safety and security of Canadians within our borders. Specifically, Budget 2016 stated that threats to Canada and emergencies can arise in many different ways and that swift and effective response to emergencies is critical for keeping Canadians and communities safe. To this end, the Government highlighted the necessity of having the right tools to take action when needed.

Furthermore, the EPR program supports other federal departments and agencies. For example, the EPR program links with the priorities of Public Safety Canada, as mentioned in

the Minister's mandate letter, which states: "This goal [of ensuring that we are keeping Canadians safe] must be pursued while protecting the rights of Canadians, and with an appreciation that threats to public security arise from many sources, including natural disasters, inadequate regulations, crime, terrorism, weather-related emergencies, and public health emergencies"[11].

The 2016-19 corporate risk profile for PHAC noted gaps in event response capacity, listing responses to large or simultaneous events as a significant and probable risk that could hinder the coordination and integration of the Health Portfolio's functions, and impact other public health priorities. Particularly, it is a priority to address internal challenges and gaps related to surge capacity and staff preparedness, before the next major public health event occurs. It is anticipated that these efforts will ensure the Health Portfolio has the capacity to respond to events, fulfill its mission and mandate requirements, and meet the expectations of domestic and international partners.

4.3 Relevance: Alignment with Federal Roles and Responsibilities

PHAC undertakes activities that fulfill an emergency preparedness and response role that is legislated and regulated for the Government of Canada as outlined in several key documents, such as the *Emergency Management Act* and the *Federal Policy for Emergency Management*.

Responsibility for preparing for and responding to emergencies in Canada is shared by the Government of Canada, provincial and territorial governments, and municipal governments. While the provinces and territories are the locus of responsibility for immediate response,[12,13] the federal government assumes responsibility for emergency management if the event is of a nature to require the Health Portfolio's involvement (e.g., radioactive/nuclear, high visibility, crossing provincial or territorial boundaries), or if a jurisdiction requests aid.[14]

The Government of Canada has an overarching EPR role as a result of the *Emergency Management Act* which stipulates that ministers are to identify risks within their area of responsibility and to prepare, maintain, test and implement plans to address specific risks, and conduct exercises and training in relation to these plans. Furthermore, the *Federal Policy for Emergency Management* states that departments have the responsibility to maintain the capacity to meet goals outlined in emergency plans, incorporate a lessons-learned process into preparedness activities, respond to emergencies in a manner consistent with these plans, and to contribute to an integrated Government of Canada response.

PHAC's foundational document, the *Public Health Agency of Canada Act* states its purpose is to assist the Minister "in exercising or performing the Minister's powers, duties and functions of public health", including public health emergency preparedness and response. Other documents outline PHAC's responsibilities to prepare, maintain, test, and implement plans to address specific risks including: pandemic[15], food-borne illness[16] and radioactive or nuclear events[17].

While PHAC's role in responding to public health emergencies is clear, there are still questions around PHAC's role in responding to social service events (such as assisting with the response to wildfires), consistent with findings in previous evaluations and audits. The *Federal Emergency Response Plan* identifies the Health Portfolio as responsible for public health and essential human services but also acknowledges that it will work with provincial and territorial governments, First Nations and Inuit health authorities, non-governmental organizations and private health resources depending on the nature of the event or emergency. Over the past five years, partner organizations such as the Canadian Red Cross (CRC) have primarily provided social service support during events and emergencies (e.g., clothing, lodging, food, registration and inquiry, personal assistance, reception centre management and social service personnel). PHAC has also continued to provide social service support (e.g., during the Fort McMurray wildfires), although not at the same level as the CRC and other organizations. Therefore, while leadership and responsibility for this function still resides with the Health Portfolio, those outside of the federal government have been more active in providing social service support during public health events.

There are also questions relating to PHAC's role in responding to international events (events that take place outside Canada with limited immediate domestic implications). Stakeholders suggested that there a lack of clarity regarding the Agency's role in the context of international public health events. International efforts are undertaken to support outbreak investigations, at the request of international organizations such as Global Outbreak Alert and Response Network (GOARN); however, the international authority to guide these activities is not well understood. Activities take place under the umbrella of Global Affairs Canada which has the mandate but not the public health expertise.

Despite these long-lasting and persistent questions of role, PHAC continues to respond to domestic public health events and emergencies that have social service impacts as well as to international public health events. No duplication of effort was noted by internal stakeholders; however, it was suggested that updated guidance in this area would better align PHAC's activities with those of other organizations and facilitate response activities.

4.4 Performance

Canadians look to their governments for protection from health risks, and they expect their governments to be ready to deal with these risks. All levels of government in Canada help to protect the health of Canadians from these threats as part of their efforts to promote health and prevent disease. Local, provincial and territorial authorities do much of that work with federal government support from the Public Health Agency of Canada's Centre for Emergency Preparedness and Response (CEPR), the Emergency Operations Centre within the National Microbiology Laboratory and Regional Emergency Coordination Centres. Practically, this involves three different stages: preparation, detection and response.

The Centre for Emergency Preparedness and Response (CEPR) undertakes its preparation role through the development, maintenance, and implementation of risk assessments and emergency management plans. Additionally, CEPR is responsible for developing and

delivering emergency management training to mobilize staff, exercises to validate EPR plans and activities, and a lessons-learned process to ensure continuous learning is achieved.

CEPR's detection activities (detecting new cases in a timely manner) are conducted through linkages with PHAC and Health Canada programs, provincial and territorial governments, other federal departments, the Government Operations Centre and international partners such as the World Health Organization and the Pan American Health Organization (PAHO). Detection activities are also conducted through specific activities and initiatives such as the Global Public Health Intelligence Network (GPHIN). Capacities for detection and notification are defined in part by the rules set out under the *International Health Regulations* (IHR).

When an event or emergency occurs that requires a Health Portfolio response, PHAC's activities should be coordinated through the Health Portfolio Operations Centre. A specialized response could also be coordinated through the National Microbiological Laboratory's Emergency Operations Centre and localized response could be directed by the Regional Emergency Coordination Centres. Responses can take many forms, depending on the nature of the event and the needs of the situation, but often include the mobilization of people and assets.

4.4.1 Preparation

CEPR engages in a number of planning-related preparedness activities with the goal of more efficient and effective responses to public health events and emergencies. The development and maintenance of emergency plans and procedures, event and threat planning, training, exercises and lessons learned are key activities to ensure this goal is realized.

Emergency Management Plans

Overarching plans, such as the Health Portfolio Emergency Response Plan (HP ERP), and several response plans annexed to the HP ERP, have been updated within the last 5 years. Although the impetus for revising a plan should be based on need, rather than revised according to a specific timeline, it is unclear if an assessment of need has been regularly examined.

The HP SEMP is the overarching framework that guides the Health Portfolio in the development and delivery of its emergency management program obligations. CEPR is responsible for ensuring that this document is reviewed at least every two years and amended as required[18]. The most recent amendment took place in March 2016, replacing the original 2012 version. A review of the HP SEMP was not undertaken between the releases of these versions.

The HP ERP provides guidelines for the Health Portfolio's operational and planning activities during an event or emergency with public health implications. It is intended to be reviewed and amended on a regular basis to ensure it reflects changes in legislation, policy or priorities as well as considerations that arise following exercises and events. The HP ERP was last updated in December 2013 to reflect governance and operational changes. Lessons learned documents suggest that there are revisions pending to address PHAC's role as lead for the

provision of emergency social services, and to address competing priorities during activations. These recommendations date back to the responses to Ebola Viral Disease (2015) and Operation Syrian Refugees (2016).

The Health Portfolio Concept of Operations provides operational guidelines and detailed roles and responsibilities for responding to a planned or unplanned event. The most recent iteration of the Concept of Operations has not been updated since its inclusion in the HP ERP in 2013, despite lessons-learned documents that suggest there are revisions needed to address concerns raised across several events, including Ebola Viral Disease (2015), Exercise Pacific Quake (2016) and Operation Syrian Refugees (2016).

As the HP SEMP and the HP ERP follow an all-hazards approach, they are supplemented by 19 hazard- or program-specific response plans that provide guidance for events with unique requirements. These plans address all high-impact and high-likelihood events identified in the Health Portfolio Health Emergency Risk Assessment Report. Furthermore, CEPR is responsible for ensuring new plans are developed when new risks are identified. The latest emergency plan to be developed is the Federal-Provincial-Territorial Emergency Response Plan for Public Health Events for the Health Sector. This plan addresses the need for formal coordination of federal, provincial and territorial responses to public health events that are biological in nature and significant enough to require a coordinated response. Although not currently implemented, the plan was approved by the Public Health Network Council in October 2017. It is unclear how much coverage these plans will have after the AHRCA is developed and the risk profile updated.

CEPR is responsible to develop and maintain integrated national health emergency response plans and has a direct responsibility to review and update seven of the annexes within the plan. CEPR works with the Centre for Food-borne, Environmental and Zoonotic Infectious Diseases (CFEZID), the Centre for Immunization and Respiratory Infectious Diseases (CIRID), the Corporate Services Branch (CSB), the Communications and Public Affairs Branch (CPAB), the Radiation Protection Bureau (RPB), the Chemical Emergency Preparedness and Response Unit (CERPU), First Nations and Inuit Health Branch (FNIHB)[iv], the Canadian Food Inspection Agency (CFIA), Public Safety Canada and provincial and territorial governments to ensure that all annexes are integrated and functional within the HP ERP.

The HP SEMP does not detail the requirements to review specific emergency plans. Stakeholders suggested that it is not necessary to update emergency plans on a set schedule, but rather when circumstances (e.g., change in legislation or policy, reflection following a lessons-learned process) require it. Stakeholders proposed that the critical activity is to review plans periodically to ensure that they are current. Other than two plans identified in the HP SEMP as being not current (the National Smallpox Contingency Plan and the Non-foodborne Zoonotic Illness Outbreak Response Protocol), there is no documentation to suggest that other plans have been assessed. However, other plans (with the exception of

[iv] In December 2017, the Department of Indigenous Services Canada (DISC) assumed responsibility for all FNIHB activities.

two without a listed date) have been updated within the last seven years. Emergency plans, the office responsible for them and the date of their last update are found in Table 3.

Table 3 Emergency Plans with Office of Principal Interest and Year of Last Update

Emergency Plan	Office of Principle Interest	Last updated
Plans with CEPR management		
Emergency Support Function #5	CEPR	2010
Food-borne Illness Emergency Response Plan	CEPR/CFEZID	2011
Operational Framework for Mutual Aid Requests	CEPR/FPT	2013
Chemical Biological RN, Explosive	CEPR	2014
FPT EPR Plan for Public Health Events for the Health Sector	CEPR/FPT	2017
National Smallpox Contingency Plan	CEPR	Not current
Major Events	CEPR	N/A
Plans managed by other Health Portfolio areas		
Food-borne illness Outbreak Response Protocol	CFEZID/HC/CFIA/FPT	2010
Protocols for Health Emergency Risk Communication	CPAB	2013
Federal Nuclear Emergency Plan	RPB	2014
Nuclear Emergency Response Annex	RPB	2015
Chemical Emergency Response Annex	CEPRU	2015
First Nations On-Reserve Annex	FNIHB	2015
Canadian Pandemic Influenza Preparedness	CIRID/FPT	2017
Business Continuity Plan	CSB	N/A
Non-foodborne Zoonotic Illness Outbreak Response Protocol	CFEZID//CFIA/HC	Not current
Plans managed by other Departments		
Federal Emergency Response Plan	Public Safety	2011
North American Plan for Avian and Pandemic Influenza	US/Canada/Mexico	2012
Cyclical Events Contingency Plans	Public Safety	N/A

Risk and Capability Assessments

The All-Hazards Risk and Capability Assessment is required to ensure other emergency preparedness activities (e.g., stockpiling, medical countermeasures) are not delayed. The most recent risk assessment was prepared in 2011 and does not contain a capability assessment.

An All-Hazards Risk and Capability Assessment (AHRCA) is comprised of two critical parts. First, the risk assessment identifies risk, and analyzes and rates threats based on the probability of occurrence and the potential impact. Second, the capability assessment, or the resources required to accomplish a mission or function and achieve the desired outcomes, complements the risk assessment by linking risk assessment and potential response. The capability assessment supports decisions and informs investment prioritization. By developing scenarios for each risk, planners are able to assess requirements for the situation against existing capabilities and highlight strengths and shortfalls. The AHRCA is also required to align activities within the Health Portfolio with activities in other government departments and Public Safety's planned process to develop a National Risk Profile.

CEPR has recognized the need to develop an AHRCA; however, it has not yet been completed despite an original target date of 2013-2014[19]. In its place, CEPR is using a Public Health Emergency Risk Assessment Report that was developed in 2011 in response to the Audit of Emergency Preparedness[20]. This assessment has been included in the Health Portfolio Strategic Emergency Management Plan (HP SEMP) and identifies risks relevant to the Health Portfolio's areas of responsibility[21].

The Health Portfolio Public Health Emergency Risk Assessment Report details all identified risks to public health, the likelihood of occurrence, and the potential impact should the event happen. It also disaggregates between unintentional events (e.g., natural disasters, weather disasters, accidents, spills, food-based disease) and intentional events (e.g., nuclear attack, medication tampering, terrorism-related attack). CEPR is currently examining the risk profile with the intention of refreshing 20% of the identified risks each year, on a five-year cycle. This work has been embedded in CEPR's performance measurement strategy to ensure it is completed as planned.

The HP SEMP details several shortcomings of this risk assessment. In particular, the Emergency Risk Assessment Report lacked an assessment of the Health Portfolio's capacity to respond to events and a formalized planning component to ensure it remains current in light of changing environments. It also notes that, until the risk assessment is updated, provinces and territories will be expected to provide expertise and anecdotal evidence on threats, risks and vulnerabilities related to their jurisdiction. Although there is no evidence that these consultations have occurred, there is evidence to suggest that planning for exercises has taken into account regionally specific threats (e.g., Exercise Huron Resolve focusing on radio-nuclear events at the Bruce Power Plant in Ontario, Exercise Pacific Quake focusing on earthquake response in British Columbia).

The delay in developing an updated AHRCA has negatively impacted other preparedness activities. Internal stakeholders reported that they used risk assessments from the Health Portfolio and expert consultation to plan exercises, develop emergency plans, and stockpile equipment and medical countermeasures. Lessons-learned documents suggested improvements that could help prioritize and define the Health Portfolio response to an event or emergency. Internal and external stakeholders suggested PHAC would benefit from developing a more complete understanding of the diverse capabilities available across the different jurisdictions and the resources that are available in these jurisdictions, as well as those stockpiled within other government departments (e.g., Department of National Defence).

Leadership for risk assessment development has recently been transferred to the Exercise Unit and a risk and capability assessment task group has been formed. A methodology to prepare the risk and capability assessment has been developed and it has been piloted to ensure suitability. Subsequently, it was leveraged during Exercise Pacific Quake to include a limited list of capabilities. It is expected that this new risk assessment will contain expanded health and hazard threat scenarios, detailed threat statements, annual workshops and consultation on priority threats, and better developed likelihood and impact assessments.

Emergency Management Training

The overall level of emergency management training for PHAC as a whole is difficult to determine, as this information is not collected in a uniform manner and not reported in aggregate. A competency-based training plan has been developed, and geographic clusters of PHAC employees (i.e., NML and Regions) have consistently received foundational training in the Incident Management Structure and general emergency preparedness and response.

The Health Portfolio has a responsibility to plan, develop, conduct, deliver, and evaluate training for Health Portfolio personnel who are required to implement various EPR plans (e.g., HP SEMP, HP ERP and annexes). The Health Portfolio Operations Centre (HPOC) Concept of Operations states that operational staff and other designated personnel with roles and responsibilities in the HPOC should be familiar with the basic principles of emergency management and the command system as well as the HPOC Concept of Operations, HP ERP and the *Federal Emergency Response Plan*. The Health Portfolio Emergency Planning Committee (operational subcommittee) is responsible for overseeing the planning cycle, which includes training.

While not covered as part of this evaluation, other types of training are found throughout the Health Portfolio. For example, PHAC has a comprehensive training program in place for public health officers and epidemiologists. Similarly, the NML has an advanced training suite for employees working with high-level contaminant agents, recognizing that specialized expertise is required to support laboratory mobilizations. Finally, before any employee can participate in an external mobilization in another country, they must complete mandatory training on the United Nations' EPR system and security measures. HPOC has developed a basic training program for external mobilizations.

Centre for Emergency Preparedness and Response

In 2012-13, CEPR established a Training Task Group with membership from CEPR, NML and the Regions to develop a learning plan and matrix describing the required training in relation to the level of functions within the IMS. The Health Portfolio Emergency Management Training Plan takes into consideration the current risk assessments, plans, and anticipated skills and experience required to respond. Despite collaboration within this task group, training opportunities remain largely separate between the CEPR, the NML and Regional Operations.

CEPR originally offered instruction through classroom learning opportunities, but has recently begun to establish an online training portfolio. The critical courses for managing in an IMS (IMS Emergency Manager Functional Training) and for acting in an executive function (IMS Planning Group Chief Functional Training and IMS Coordination and Logistics Group Chief Functional Training) were only recently made available. Data is limited to fiscal year 2016-17 for manager training and no data is available for Health Portfolio Executive Group training. Table 4 presents the number of individuals who have taken courses offered by CEPR towards fulfillment of the learning plan.

Table 4 Number of individuals completing CEPR IMS coursework

Course Offering	Number trained 2012/13 to 2016/17
Below are general information for all employees	
Home and Workplace Preparedness for All	159
Orientation to Emergency Preparedness and Response in the Health Portfolio	108
Below are to serve in an IMS	
What to Expect in an Activated Emergency Operations Centre	193
Orientation to the IMS in the Health Portfolio	171
IMS General Staff Functional Training	85
IMS Emergency Manager Functional Training	1
Below are to serve in the executive function	
IMS Planning Group Chief Functional Training	0
IMS Coordination and Logistics Group Chief Functional Training	0

Internal stakeholders indicated that that there were also training opportunities that arose in the form of job shadowing during activations. This form of practical training was primarily used to staff ongoing activations. It was not tracked by CEPR and documentation was not available for inclusion in future activation rosters. Training opportunities were also available in connection to exercises. Participants in exercises often underwent orientation and training prior to participation. Although the emphasis of this training was functional for the exercise, it also included basic IMS and EPR content. This form of training has not been tracked by CEPR and was not available for inclusion in activation rosters.

Prior to serving in an IMS, an individual is to complete all training indicated on the learning plan associated with the levels at which they wish to serve. Although CEPR tracked the number of individuals who have attended classroom courses and the number of online courses that individuals completed, it did not track the courses that an individual has taken to ensure their learning plan has been fulfilled. Tracking training in this manner did not facilitate the development of a known roster of employees who are fully equipped to serve in an IMS. It also did not permit the identification of individuals across different functional groups (e.g., communications, procurement, finance) who have received the required training.

Training offered in the regions is available to all employees of the Health Portfolio (i.e., PHAC, Health Canada, FNIHB) to maximize the base of individuals available. Courses are offered jointly with the NML, Public Safety and provincial and territorial counterparts when appropriate. Information regarding emergency management training activities in the regions was not centrally held. Data regarding the number of attendees at each course was available, but data regarding the number of employees that are fully trained was not easily accessible.

National Microbiological Laboratory

All staff at the NML received sufficient training to meet the basic requirements to serve in the NML EOC. The NML maintained an emergency management training calendar that was flexible, in order to accommodate training requirements identified at the start of the year. The current focus is to advance the levels of training of NML staff in locations other than Winnipeg (i.e., Guelph, St. Hyacinthe and Lethbridge).

NML used the Laboratory Information Management System (LIMS) to track the number of individuals who participated in training opportunities as well as the courses taken toward achieving the level identified in the learning plan. This tool facilitated the development of a roster of staff suitable for each level of participation during an event. Furthermore, LIMS tracked participation in past events and exercises and was able to identify these individuals. At the time of the evaluation, there were 145 NML staff members (Winnipeg and Guelph) who had this type of past emergency operations centre experience. Table 5 presents the number of active NML staff who were current in their training for participation in the NML EOC.

Table 5: Number of trained individuals available to participate in the NML EOC

Course Offering	Current /Active NML staff with training
Below are mandatory for all NML personnel	
ICS 100	452
Introduction to Emergency Operations Centres	449
Below is required to fill a position within the NML EOC	
Emergency Operations Centre Essentials	338
Below is to fill NML EOC Management Staff position	
Emergency Operations Centre Level three	212

Outside of the NML, there is little evidence of an Agency-wide roster of trained individuals. This information would be helpful in ensuring that the Agency is well-positioned to meet mobilization needs at an IMS function and level (junior or senior).

Lessons learned from preparedness exercises have noted a lack of consistency in training received by staff mobilized to work in the HPOC, and have identified training as a weak point in regards to the exchange of information prior to, and during, the initial activation. It was noted that those serving in the IMS did not fully understand the information requirements, to whom it was to be given, nor the appropriate points of contact. Some internal stakeholders agreed with these findings and noted that training deficiencies for mobilized employees have resulted in difficulties during the first weeks of activation. This difficulty could be partially resolved if the responsibilities of various positions were better understood through training.

Emergency Response Exercises

PHAC conducts exercises that simulate emergency events for training purposes, as well as for validation of capabilities, plans, policies, and procedures. After participating in exercises managed by PHAC, the vast majority of participants felt better prepared to respond to a public health event.

The Public Health Agency of Canada has conducted a wide variety of exercise activities to meet its obligations under the *Emergency Management Act*. CEPR's Exercise Task Group prepares a multi-year exercise plan reflecting emerging priority areas. These plans are prepared annually in alignment with plans from the broader Health Portfolio, other federal, provincial and territorial exercise plans and they are synchronized with the National Exercise Calendar held by Public Safety Canada. Exercises draw on diverse methods, ranging from workshops and table-top exercises, to full-scale whole-of-government and Health Portfolio exercises.

The NML maintains their own exercise plan to support the implementation of their emergency management program and to address internal response challenges. The NML's exercise plan is integrated with their training plan to ensure complete coverage for the validation of plans and procedures. The NML also incorporated the evaluation of the human resource component of an exercise to assess the personal suitability of participants who wish to assume an operations centre position during an event.

The Health Portfolio participated in, designed, and delivered approximately 150 exercises over the course of the evaluation period. CEPR was involved in approximately 20 exercises per year and has been involved in 17 major exercises to test for gaps in coverage, test emergency plans, and prepare for upcoming events. The HPOC was activated for three exercises in the first two years but, in consideration of real incidents requiring activation, there were no exercises at this level in the following three years. The NML was involved in approximately six exercises a year and has activated the NML EOC for 16 exercises between 2012-13 and 2016-17.

CEPR supported the regions by developing exercises when requested and offering support and coordination for exercise activities hosted by provinces and territories. CEPR also canvassed the regions for upcoming exercises to be included in a quarterly exercise update. Regional operations were typically involved in four exercises a year. The Regional Emergency Coordination Centres (RECCs) have been activated for 15 exercises between 2012-13 and 2016-17.

Key informants reported very favourable comments on the Health Portfolio's exercise programs. Exercises were positively received and viewed as a corporate strength by all respondents, including provinces and territories, other government departments, and those within the Health Portfolio. Stakeholders reported that additional exercises would be beneficial, even if this required less complex exercises to be developed. Many also suggested that they would appreciate being invited to participate in any exercise deemed appropriate. Furthermore, it was suggested that exercises at the national level with PHAC as lead could increase CEPR's understanding of provincial capacity and solidify provincial understanding of PHAC's role.

Lessons Learned

Although the lessons-learned process has been poorly implemented, there is evidence that the Health Portfolio is adapting processes to better prepare for, and respond to, future public health events.

According to the HP SEMP, Assistant Deputy Ministers for all Health Portfolio branches are responsible for ensuring the lessons learned from exercises and events are implemented into their programs as required. There does not appear to be documentation of distinct responsibilities for CEPR, NML and Regional Operations in regards to the implementation of lessons learned from exercises and events, yet CEPR and NML and the Regions have separate processes for lessons learned that overlap only when there is a joint activation.

Although the processes are functionally separate, the process has similar steps and produces similar documentation. For all organizations, this is a multi-step process, aimed at producing several documents to ensure recommendations are generalized, rather than limited to the context of a single event. The process begins with a discussion and evaluation of performance to be completed immediately following an event or exercise (otherwise known as a hotwash). These hotwashes are then rolled up into either an After-Action Review (AAR) following an exercise, or an After Incident Review (AIR) following an event that required the activation of an operations centre. Results of the AAR and AIR are analyzed to create an improvement plan to for the organization's capacity to respond to future incidents. The implementation of recommendations that follow from improvement plans is tracked in a lessons learned document.

Centre for Emergency Preparedness and Response (CEPR)

CEPR is in the process of implementing a revised lessons-learned plan. It includes more clearly defined areas of responsibility and processes to ensure that follow-through is better articulated. This plan indicates that hotwashes are to be completed within one week following de-escalation of an event, the draft report and improvement plan are to be completed within 30 days of de-escalation, and the final report is to be completed within 90 days of de-escalation.

Lessons identified through CEPR's new lesson-learned process are to be parsed into three categories, which should help clarify governance associated with implementation:

- strategic (observations that lie outside the Health Portfolio and need to be referred to higher levels for influencing action);
- tactical (observations which deserve senior management attention and tracking in the lessons-learned process); and
- operational (observations which program areas have the resources, mandate, and authority to address).

In the period prior to the revised plan, CEPR completed two annual Lessons Learned reports: one for events from November 2012 to February 2014 and another for events from December 2013 to April 2015. These reports covered all but one (Exercise Huron Challenge) major events and exercises, as well as some events with an HPOC level 1 activation. To facilitate movement to CEPR's new lessons-learned process, outstanding improvement plans completed for six events and two exercises dated between 2011 and 2014 have been reviewed to ensure that critical recommendations can be tracked. Other, less critical, recommendations have been archived.

In addition to providing a summary of corrective actions taken, and their stage of implementation, these documents detailed several shortcomings regarding the lessons-learned process. Specifically, it was noted that there was a need for a more systematic approach to the lessons-learned process, with increased standardization in data entry, less ambiguity in determining the appropriate corrective action, and ensuring that these actions are completed in a timely manner, with clear lines of accountability for their completion.

It is expected that there should be an AAR/AIR for every event and major exercise; however, the collection of information relating to lessons learned was inconsistent for both events and exercises. Of the 10 major events that occurred over the evaluation period, three did not have AARs available for review (Syrian refugee response ended March 1, 2016, Zika response ended January 13, 2017, and Fentanyl response ended March 31, 2017). The vast majority of internal program area representatives and stakeholders agreed that post-event follow-up was inconsistent. They noted that the time from event to hotwash can be several months and that this negatively affected the quality of reviews. Furthermore, results from AARs and AIRs were rarely implemented within timelines, and recommendations were not consistently shared with participants or the broader health portfolio community. The evaluation also noted that, when these documents are completed, they do not appear to be held in a central repository for easy reference and follow-up.

Although there has been little systematic tracking of AAR recommendations, there has been anecdotal evidence that AARs and AIRs have been used to direct change. For instance, it was reported that risk is better managed as a result of lessons learned following the response to H7N9 and Middle East Respiratory Syndrome – Coronavirus (MERS-CoV). The National Emergency Strategic Stockpile (NESS) undertook a modernization exercise and developed an inventory management system as a result of a review of lessons learned. The Health Security framework was established following Ebola. Furthermore, information contained in

these reports has been useful for this evaluation in outlining challenges in emergency management.

National Microbiology Laboratory Emergency Operation Centre (NML EOC)

The NML has a standard operating procedure to govern the completion of the AAR process. The NML may conduct informal AARs throughout an event to quickly evaluate performance, and identify strengths and weaknesses, or it may conduct formal AARs at the conclusion of the event. If the NML EOC is only partially activated, a team report may be produced rather than an AAR. After-action reviews include an improvement plan matrix that is tracked through the Laboratory Information Management System (LIMS).Completion of this process is tracked for inclusion in the NML's quality management system that conforms to the international standard ISO 9001:2008. It is expected that this will ensure that issues, challenges and items discussed in hotwashes are identified as corrective actions in AARs and AIRs, and become lessons learned.

After-action reviews were completed for full-scale activations (12), as well as team reports for events in which the NML EOC was not fully activated (3). The expected service standard to complete these reviews was changed from 15 days to 30 days, following a consultation with ISO auditors in 2016. Using the current service standard, NML was in compliance 75% of the time, with the average time to complete an AAR process was 29.75 days. The inability to meet hotwash timelines was due to understaffing (MERS-CoV, 53 days; Microbiological Emergency Response Team (MERT) research mobilization, 132 days) and large amounts of information to process (Zika, 31 days).

The NML also tracks completion of improvements resulting from AARs. There were 132 improvements recommended across 12 activations. Of these activations, the recommendations from 10 events have been completed. Two events currently have outstanding recommendations. The response to Ebola has half of its recommendations unimplemented, and all recommendations for the response to Zika remain outstanding.

According to the NML's standard operating procedure, the results of their lessons learned activities are to be compiled for inclusion in the Health Portfolio's reports. CEPR has reported the results of NML's activities in one instance, the 2014-2015 Lessons Learned annual report. There is little evidence that NML's lessons learned have been adopted by CEPR.

Regions

Regional Emergency Coordination Centres (RECCs) are typically activated in conjunction with the HPOC, the NML EOC, or a provincial or territorial emergency operations centre. Regional Operations' lessons-learned activities include participating in hotwashes, reviewing the resulting AARs and AIRs, and making improvements to regional activities when implicated in a review conducted by CEPR. There were no regionally-led AARs available for review.

Stakeholders noted that Regional Operations share lessons-learned reviews from their respective provincial counterparts for activities that have been jointly undertaken. Although,

their primary responsibility is to review for areas of impact, there was little documentation or recording of these reviews to identify a broader Agency impact. CEPR reports on lessons learned from activations jointly conducted with the RECCs but there was no evidence of a central repository for provincial and territorial AARs that involved Regional Operations but not CEPR.

Efficiency Measures

A more concerted effort by CEPR to complete the lessons-learned process following events and exercises within an appropriate time period is expected to facilitate the communication of results and an earlier adoption of improvements to EPR systems. Including lessons learned from events and exercises conducted by the regions and NML would further this initiative, without the costs associated with direct participation by HPOC.

4.4.2 Detection

Systems for gathering, generating and sharing public health related intelligence on potential public health threats domestically and worldwide are in place. The Global Public Health Intelligence Network is a key source of information about public health events, with outputs shared broadly with relevant partners. In some instances, detection and response activities are also supported by the services of the Medical Officer on-Call.

***International Health Regulations* National Focal Point**

The *International Health Regulations* (IHRs) are an international treaty requiring signatory countries to build their capacity to detect, assess, report and respond to public health events. Implementation of the IHR in Canada is a collaborative effort between the Government of Canada and the provincial and territorial governments. PHAC is the National Focal Point for the IHR and CEPR acts as the single window for rapid communication between Canadian public health authorities, the WHO, the Pan-American Health Organization, and health authorities in other countries. Other Canadian government departments with EPR activities that touch on health-related events (e.g., Department of National Defence) have designated IHR champions to facilitate coordination and communication.

Canada has surpassed the level expected by State Parties and is working toward an advanced level in which it advises other countries regarding the IHRs. Since 2012, Canada has met the targets set by the IHR. Although there have been challenges in a few areas, these items have since been resolved. For instance, in 2013, there was a concern regarding standard operating procedures for communication between PHAC as the National Focal Point and partners involved in the response. Improvements were noted in 2014 regarding National Focal Point communications, surveillance and laboratory core capacities. On two separate occasions, PHAC has not reported cases or outbreaks within the required 24-hour period although the Agency has mitigated the impact by providing information through other reporting mechanisms (International Food Safety Authorities Network (INFOSAN), or shortly after the required period (i.e., within two days once evidence had been confirmed).

Internationally, CEPR has also supported information sharing by aiding in the development of national focal points in other countries. Between 2014 and 2016, Canada's IHR National Focal Point participated in, or contributed to, Pan-American Health Organization and World Health Organization-led missions in Barbados, Dominica, Brazil and Colombia. It has also engaged in bilateral exchanges with Brazil. Digital surveillance, such as the Global Public Health Intelligence Network (GPHIN), is viewed as an essential complement to formal surveillance structures, as it improves early detection and response[22].

Global Public Health Intelligence Network (GPHIN)

The Global Public Health Intelligence Network was established in 1997 by Health Canada, in collaboration with the WHO. It is a web-based public health surveillance system that is used to detect, analyze, and disseminate information regarding potential or confirmed public health events. The application monitors open-source information, including media sources, in nine languages: Arabic, English, Farsi, French, Portuguese, Russian, Simplified Chinese, Spanish, and Traditional Chinese. A team of multidisciplinary and multilingual analysts analyzes incoming data and disseminates alerts, reports, and other notifications.

GPHIN was responsible for approximately 50% of the WHO's Early Alerting and Response system data. It was credited with first alerting the authorities about MERS-CoV in 2012, detecting the emergence of the H7N9 influenza and the re-emergence of Polio in Cameroon in 2013. It also played a significant role in detecting the Ebola outbreak in 2014.

GPHIN also routinely reported on public health events for surveillance on mass gatherings and has been used to monitor the cancellation of flights, travel advisories and health screening procedures at border crossings (e.g., during response to Ebola). GPHIN has provided access and training to a number of WHO member states to help implement event-based surveillance capacity. Bilateral partners (Brazil and China) have been provided with GPHIN accounts, access, and training. GPHIN continues to provide reports for mass-gathering events, such as those in Brazil (e.g., 2014 FIFA world cup, 2016 Olympic and Paralympic games) and relevant outbreaks (e.g. Zika virus). Expertise was also provided to support Brazil's Ministry of Health in their development of smart phone application which used participatory surveillance during the 2016 Olympic Games.

Medical Officer on-Call

The Centre for Emergency Preparedness and Response (CEPR) can be notified by lead program areas, PT authorities or other stakeholders regarding potential emergencies through the Operations Centre Watch Office, which acts as the central coordination point for relaying event information. A duty officer relays information to the program area responsible for an initial assessment, and to a medical advisor to identify other potentially implicated Health Portfolio program areas. In some instances (i.e., outside of regular business hours), the duty officer is to pass information to the Medical Officer on-Call (MOOC). The MOOC is to coordinate the Health Portfolio assessment in conjunction with applicable hazard and security focal points.

It is the responsibility of the implicated program area, the medical advisor, or the MOOC, informed by a defined set of response triggers and considerations, to determine whether the situation warrants the convening of a Health Portfolio Situational Assessment Team (HP SAT). It is this assessment team that determines if a response is required from the Health Portfolio. If the situation does not warrant an assessment team, the implicated program area, the medical advisor, or the MOOC informs senior management, as applicable, and the situation continues to be monitored. If the situation does require further assessment, the implicated program area, the medical advisor, or the MOOC informs their director general or executive director or CEPR, and contacts the HPOC Watch Office to convene a Health Portfolio Situational Assessment Team.

Efficiency Measures

CEPR does not systematically collect or store information in regards to how detection information is shared more broadly within the Agency, and little was available for the evaluation to review. Previously, an audit of EPR activities found that there was confusion regarding who was to be responsible for passing information on to senior management. Stakeholders suggest that this problem continues. It was reported that information was being passed on to senior management through the MOOC, without the program having an opportunity to first address it.

Regardless of these efficiency challenges, there was no indication, either through documentation or via stakeholders, that PHAC was unable to detect public health events of significant concern.

4.4.3 Response

The Agency's response activities are the culmination of preparedness and detection activities. The Agency responds to events that impact the health of Canadians by coordinating the efforts of the Health Portfolio, other government departments, provinces and territories and non-governmental organizations. For some but not all events, it is necessary to activate an emergency operations centre to facilitate a response. In addition to coordination, PHAC may also provide resources and personnel.

It was difficult to describe the impact of activities undertaken by the operations centres on the outcomes of events. The uniqueness and fluid nature of emergency events, and of the response to these events, did not permit the development of a baseline against which to compare activities. Furthermore, documents outlining the objectives of activating emergency operations centres, and how these objectives were achieved, were not available. Instead, any after-action reporting tended to focus on system efficiency (e.g., training, communication).

Nevertheless, it was noted that the vast majority of key external stakeholders (other government departments, provinces and territories) reported that all activations between 2012-13 and 2016-17 were successful. They were generally appreciative of PHAC's support, advice, and guidance during a public health event, and felt that the Agency's response activities had improved since responding to H1N1 influenza in 2009. They also indicated that,

while challenges were experienced, but that these were neither excessive, nor unexpected, when responding to public health events.

Emergency Operations Centres

As noted previously, PHAC has several operations centres which it can draw upon to facilitate preparation for mass gathering and high-profile events, and to respond to natural or man-made disasters. These operations centres also help Canada fulfill its international obligations to respond to both domestic and international events, such as infectious disease, pandemic influenza, and bioterrorism. The HPOC is the central command and coordination platform for emergency response. It operates in conjunction with the NML EOC and the RECCs. These operations centres operate independently and may or may not activate at the same time.

Health Portfolio Operations Centre (HPOC)

The HPOC maintains a level 1 state of readiness to support Agency monitoring, detection and alert activities. At this level, it acts as a single window to coordinate response activities to identified public health events and act as a point of contact for emergency management support, facilitating the sharing of information, supporting FPT response activities, and coordinating the portfolio response with the NML EOC and RECCs. At this level, it can also act as the single window for mobilized national and international deployments.

When an event occurs, an operations centre is activated to a response level commensurate with the degree of activity required to respond to the event. Governance during a response is dependent on the level of HPOC activation. The HPOC and RECC emergency response structures use an Incident Management Structure (IMS) as a standard approach to coordinating response functions (including personnel, facilities, equipment, procedures and communications). When an HPOC activation occurs with a Health Canada Lead at a level 2 or greater, a Health Portfolio Executive Group is established and assumes responsibility for providing strategic direction and oversight. While membership in this group has the flexibility to be tailored to fit the circumstances of the response, it is normally comprised of senior executives who provide strategic direction and oversight to the response. This group also advises the Minister of Health regarding the response effort. For HPOC activations up to the level that a Health Portfolio Executive Group is established, leadership is provided through the establishment of a PHAC Executive Planning Group in tandem with, or in lieu of, a Senior Foresight Committee.

The National Microbiological Laboratory Emergency Operations Centre (NML EOC) uses an Incident Command System (ICS)[v]. Strategic direction and response planning in the NML EOC is provided 24/7 on a rotational basis by 12 Operations Centre Directors.

[v] The Health Portfolio emergency response structure is an IMS modeled upon ICS principles of command and control, but expands on an ICS with a multi-agency coordination function.

Authority to elevate the activation level varies. While level 2 activations require the authority of the branch head of HSIB and the director general of the program area, the decision to activate at level 4 is made by the Health Portfolio Executive Group. Table 6 presents a more complete description of the activation levels, as well as the number of activations at each level, and days spent at that activation level for 2012-13 to 2016-17.

Table 6 Health Portfolio Operation Centre Activation level

Activation level	When used	Description	Personnel	Authority	Effect on program area	Events
1 Surveillance, detection and alerting	HPOC day-to-day operations are conducted as usual. Health Portfolio IMS been not been mobilized.	HPOC develops Situational Awareness Briefings in coordination with Health Portfolio Program Areas to be communicated to emergency management stakeholders. No extraordinary actions taken by HPOC staff.	HPOC personnel are in their workplaces performing usual activities.	Director, Office of Situational Awareness and Operations	Normal operations All-hazard information is monitored and recorded by HPOC Watch Office Program.	Total # events: HPOC: 6 RECC: 4 NML: 1 Total days at with level one events: HPOC: 124 RECC: N/A NML: 40
2 Increased vigilance and readiness	When the impact, or potential impact, of an event requires increased coordination and planning as it exceed the capacity of the affected Health Portfolio program(s).	Many normal activities continue to be carried out. Greater surveillance of the event and operational coordination is conducted.	Professionals and resources from Health Portfolio Program Areas may be relocated to the HPOC.	Branch Head, HSIB and DG of Program Area	Many normal activities continued Greater surveillance of the event Greater coordination of information and response activities between stakeholders	Total # events: HPOC: 10 RECC: 9 NML: 7 Total days activated: HPOC: 1067 RECC: N/A NML: 114
3 Partial escalation	When the impact, or potential impact, of an event requires **greater use** of Health Portfolio assets and resources to adequately respond.	Response activities will be scaled to meet the requirements set forth by the EM. Frequency of response activities and generation of planning and briefing products likely to increase with the increase in the impact or potential impact of the event on the Health Portfolio.	Staff may be asked to work beyond a routine eight-hour, five-day work week. Staffing based on an assessment of the current and projected situation provided by the IMS Chiefs/affected program area(s).	Branch Head, HSIB and ADM of Program Area	Program Area(s) may be curtailed or placed on standby. Normal activities of the HPOC will be suspended to provide surge capacity for the response.	Total # events: HPOC: 0 RECC: 0 NML: 8 Total days activated: HPOC: 0 RECC: 0 NML: 443
4 Full escalation	When the impact, or potential impact, of an event requires the **greatest use** of Health Portfolio assets and resources to adequately respond.	Response activities will be scaled to meet the requirements set forth by the EM. Frequency of response activities and generation of planning and briefing products likely to increase with the increase in the impact or potential impact of the event on the Health Portfolio.	Staff to work beyond a routine eight hours, five day work week. HPOC IMS will be staffed up to 24/7 coverage as determined by Emergency Management, Health Portfolio IMS Chiefs and approved by the Health Portfolio Executive Group.	Health Portfolio Executive Group	Program Area(s) may be curtailed or placed on standby. The Health Portfolio Executive Group will meet on a regular basis.	Total # events: HPOC: 0 RECC: 0 NML: 0 Total days activated: HPOC: 0 RECC: 0 NML: 0

There were 11 events from 2012-13 to 2016-17 identified by CEPR as a level 1 monitoring situation, all of which took place in 2012-13 and 2013-14. Events at level 1 were most often in response to a less severe national disease outbreak (e.g., Escherichia coli) or to a localized disease outbreak (e.g., rabies in Toronto, H5N1 influenza). Level 1 monitoring situations also included localized disasters or potential disasters (e.g., Lac Megantic train derailment, Hurricane Sandy). CEPR also identified HPOC as monitoring the response to a drug shortage.

The HPOC raised its activation level to level 2 for 10 unique public health events between 2012-13 and 2016-17. While most activations were in response to disease outbreaks (i.e., E. coli, H1N1v influenza, H7N9 influenza, MERS-CoV, Ebola, Zika), one activation was for a location specific event (Alberta wildfires), one was in response to a planned event (Pan American and Parapan American Games) and two activations were for other concerns (Syrian refugees, Opioid crisis).

The period of time that HPOC was activated at level 2 ranged from eight days (H1N1v) to 614 days (Ebola). Events between 2014-15 and 2016-17 resulted in HPOC being activated on a near continuous basis (969 days, 88% of three years). This is a considerable change from the previous two years in which the HPOC was activated for 13% of the time. PHAC's responses to Ebola and Zika contributed the most to this difference.

Internal and external stakeholders reported that they had perceived a change in the nature of activations, suggesting that there had been a move from traditional public health events (responding to biological situations, such as influenza, or social support events, such as flooding and fires) to non-traditional events (e.g., Syrian refugees and opioids). Some felt that there was confusion regarding roles and responsibilities for responding to non-traditional events like the opioid crisis. This perception was validated by the types of events the Agency has responded to from 2012 to 2017, as well as some after-action reports. Furthermore, the mandate letter to the Minister of Health, issued October 4, 2017[23], asked the Minister to "work with the Minister of Public Safety and Emergency Preparedness to review Canada's framework for dealing with public health emergencies". At the time of the evaluation, PHAC was considering its role in responding to these types of events.

National Microbiological Laboratory Emergency Operations Centre (NML EOC)

The NML EOC maintains a baseline level 1 state of readiness for monitoring, detecting and alerting. There were 29 events that were noted to have occurred between 2012-13 and 2016-17 at a level 1 activation. Unlike the HPOC, activations at a level 1 in the NML EOC are generally limited to training (21) and exercise (7) purposes. One exception occurred during the period of this evaluation.

NML raised the activation level of its EOC for 15 events from 2012-2013 to 2016-2017. The NML EOC was most often (nine times) activated in response to disease outbreaks (e.g., E. coli, Ebola) but was also activated to support the Microbiological Emergency Response Team (MERT) on three occasions, once for a planned event and twice for other events. Of the 15 activations, there were eight activations at level 3, six of which were between 2012-13 and 2014-15 and two (Ebola and Zika) were between 2015-16 and 2016-17.

The periods of activations at levels 2 and 3 ranged from three days to 238 days (Zika). The NML EOC was activated for a total of 530 days over the last five years (29%) and for 398 days over the last three years (36%). There were a total of 443 days of activation at level 3 and 114 days[vi] at level 2.

Regional Emergency Coordination Centres (RECCs)

The RECCs have four levels of activation that are functionally similar to levels within HPOC. RECC levels of activation can be determined on the authority of the PHAC regional director or Health Canada's most senior official in the region, dependent upon the Health Portfolio lead for the response. Once activated, RECCs may be capable of supporting 24/7 operations depending on the nature of the event or emergency, but may require additional human resources to be mobilized from other regions and maintain operational requirements for prolonged periods

Information regarding RECC activations was not centrally held by CEPR; specific information on activations was sporadic but more often available for recent activations. Therefore, it appears that the RECCs were activated more frequently than reported here. The RECCs were active for four events at a level 1. Two of these activations were for planned events (FIFA U-20 Women's World Cup and Pan American and Parapan American Games) and two were for response to natural disasters (Hurricane Sandy, First Nations evacuation).

In addition, Regional Operations elevated the activation level of the RECC to level 2 for nine events from 2012-13 to 2016-17. Most activations were for region-specific events; however, three activations were aligned with activations that were simultaneously occurring at the HPOC and NML EOC (Ebola, Syrian refugees, and Opioids).

Mobilization

The success of the Health Portfolio's work in emergency response is dependent on the mobilization of staff. Mobilization is the temporary assignment of people outside of their normal work function and/or location in order to support efforts related to event response. This includes mobilizations to support operations centres within the Health Portfolio (HPOC, NML EOC, and the RECCs) and to support field operations external to the Health Portfolio in response to a request for assistance received from either a province or a territory, or from an international partner. CEPR also helps mobilize personnel from provinces and territories to support other provinces and territories.

CEPR serves as the Health Portfolio single window and platform for planning and managing the coordination of response activities to public health events and emergencies. It coordinates the surge capacity of health professionals across provincial and territorial jurisdictions during public health events and emergencies using the Operational Framework for Mutual Aid Requests (OFMAR). CEPR also supports the coordination of domestic and

[vi] A difference is noted between the sum of the days active for levels 2 and 3 and the reported aggregate number of days because the NML EOC was active at both a level 2 and 3 at the same time for several days in 2012-13 and in 2016-17.

international deployment of Agency staff within the parameters of national, provincial, territorial and international framework agreements (e.g., the WHO's Global Outbreak Alert and Response Network).

Operation Centre Mobilization

If the level of support for an event requires a coordinated Health Portfolio response, an Incident Management Structure (IMS) is mobilized by CEPR in accordance with the HPOC Mobilization Protocol. This structure allows for a surge capacity to aid in completing required tasks. According to key informants, it is not necessary to fill all positions for every activation, so the emergency manager selects command staff as required; however, it is intended to include an emergency manager and deputy manager, representatives from legal, communications, and strategic policy, and group chiefs for operations, planning, logistics, and corporate services.

The primary source for IMS staff should be a pool of Health Portfolio employees who have the support and approval of their managers. The number of supporting individuals is expected to increase with the need for greater coverage at higher activation levels. Group chiefs request additional IMS staff through the Corporate Services Chief, as per identified requirements, and can be scaled up or down depending on need. Should the event require a 24/7 operational period, the emergency manager is to inform section chiefs and arrangements are to be made, in consultation with the corporate services chief and HPOC human resources representatives, for additional staff. If the requirements of the IMS exceed this established pool, resources from outside of the Health Portfolio (e.g., established health reserves, other government departments) can be brought in through established human resource response measures.

According to program staff, CEPR was able to sufficiently fill IMS structures for all activations between 2012-13 and 2016-17. Documentation on staff mobilized for activations within the HPOC, however, is limited. It is therefore hard to confirm whether there was a fully staffed IMS structure for events, although program staff also noted that, while all positions may not be filled as anticipated by the IMS, the work required is still completed (staff mobilized performed multiple functions).

Although no external stakeholders reported concerns with the ability of the HPOC to operate with the available staff, internal stakeholders noted concerns that the recent spate of activations may have negatively affected those who participated, which was confirmed by lessons learned conducted over the past few years. This is even more apparent within the last three years of the evaluation period, in which the HPOC was activated almost non-stop throughout this period. Specific details on how participants in the mobilization were impacted were not available, although there was a general sense that these events led to some burnout or stress for employees. Through interviews, and as outlined in some after-exercise and event reporting, many internal stakeholders suggested that, in the future, large or protracted events may continue to place hardship on the health and well-being of PHAC employees.

Current documentation does not propose a set number of employees that should be available for mobilization. The 2013 HPOC Concept of Operations does not estimate a total number of individuals, but does propose that to accommodate longer periods of activation without undue hardship, CEPR should be able to staff an HPOC with a proper rotation for a minimum of 21 days with a 24/7 operational period. It also notes that adequate staffing should include identifying a sufficient number of individuals with the appropriate skill set to take on the positions required, accounting for back-up and succession planning, to address availability and turnover. Training documentation suggests that the Health Portfolio requires approximately 600 individuals in a surge capacity pool to support the IMS structure. A registry pool of this size would allow for resourcing of the various IMS roles for four to six weeks with work shifts of either 8 or 16 hours and certain key roles requiring 24/7 coverage. This would be done in a manner that ensures adequate depth, rotations, and possibility of days of rest. The NML training and exercise document suggests that the NML EOC would require eight to ten trained staff for each operations centre position in order to achieve the PHAC mandate.

As noted earlier, insufficient documentation was available to determine if CEPR is responding to events in the most efficient manner. There are a number of support tools identified in the HP ERP that could be used to simultaneously document decisions and activities, and guide the successful completion of each stage of activation. Yet, material received from CEPR suggested that these support tools have not been implemented on a systematic basis. The importance of this record-keeping was highlighted when reviewing HPOC activities in response to events from 2014-15 to 2016-17. HPOC was activated at a level 2 for these events, which would suggest that there should be no disruption of regular activities – there would be greater surveillance and coordination of activities across the Agency but normal operations should have continued across CEPR and the Health Portfolio. However, many documents and key internal stakeholders reported that regular activities were impacted by events over the last three years (e.g., development of Pan-Canadian All-Hazards Health Emergency Response Protocols, the modernization of the NESS, and several training activities). These delays have occurred despite the descriptions of activation levels in the HP ERP suggesting that there should be no disruption of regular activities. In addition, stakeholders reported that during the Ebola response employees were working beyond what was considered a regular work day (e.g., employees working 16 hours per day, 7 days a week). Staffing decisions such as this are typically associated with a level 3 activation.

Having accurate record-keeping of mobilization data would allow for analyses to determine if efficiencies were possible, if activation levels were appropriate with mobilization numbers, and could even provide indications for mobilization gaps that could be addressed prior to future events.

In addition, according to a few internal key informants, the cost of mobilizing staff from outside of CEPR to the HPOC is the responsibility of the home organization (i.e., CEPR does not pay for the salary of staff participating in an activation). Although stakeholders did not specifically report financial concerns, several did suggest that releasing staff for a response placed considerable pressure on the organization to continue to perform at the same level, in the absence of a full complement of staff. Moreover, many internal key informants, both internal and external to the program, suggested that mobilization for activation impacted the ability to conduct regular activities within the Agency. While little internal documentation is

available to support this conclusion, evaluation findings in other areas[24] suggest that there is a lack of prioritization of activities when programs are involved in the response to public health events.

Field Operations

Between 2012-13 and 2016-17, PHAC was able to draw on its personnel to respond to many public health events that occurred within Canada and in other countries. It has also helped to arrange interprovincial support through its Operational Framework for Mutual Aid Requests (OFMAR). In addition, specialized teams have been developed to enhance Canada's field operations. PHAC's domestic response to Ebola included pre-identified response teams, and PHAC's national and international capacity to respond to bioterrorism or biological warfare is supported by NML's MERT.

Although CEPR may mobilize a variety of health professionals from within the Health Portfolio, it most frequently deploys epidemiologists to the requesting region. Between 2012-13 and 2016-17, CEPR was able to accommodate all domestic requests for assistance and mobilized 62 employees to support these requests. There were a total of 47 domestic requests for assistance. There were four instances where Health Portfolio programs requested assistance: the Infrastructure Integration Division, the Centre for Food-borne, Environmental, Zoonotic and Infectious Diseases (CFEZID), the Centre for Immunization and Respiratory Infectious Diseases (CIRID), and GPHIN.

International mobilizations of personnel to support capacity building and event response serve to strengthen global and regional health security. This has direct and positive impacts on national health security and the health of Canadians. By mobilizing personnel internationally, PHAC can build important networks to gain credible and timely intelligence to inform domestic risk assessments and subsequent measures. International mobilizations also help develop the Health Portfolio's workforce through training and experiential learning.

In this same period, PHAC received 55 requests for assistance from international partners, the bulk of which came through the WHO Global Outbreak Alert and Response Network. PHAC responded to 21 (38.2%) of these requests, which led to the mobilization of 93 employees. Documentation as to why a request for assistance was not accepted was not available for all requests. In some cases, it was documented that the request was not filled because it was deemed more appropriate to use other mechanisms or other government departments to provide support. In other instances, the request for assistance was already filled by partners closer to the requesting country.

As an alternative to mobilizing Health Portfolio employees, CEPR established OFMAR in 2013 to coordinate requests for resources between jurisdictions. The feasibility of OFMAR as a means to identify, consolidate and relay information about healthcare professionals from across the country was validated through a series of workshops, drills, and exercises. Originally conceived as a support for the mobilization of doctors and nurses, it was used to identify allied health professionals across the country for deployment. During the 2013 floods in Alberta, OFMAR identified over 80 environmental health workers certified in public health inspections from across the country. Although Alberta ultimately chose to draw upon a

bilateral agreement with British Columbia, potential resources were identified through the OFMAR process. OFMAR was also activated to support Alberta during the 2016 wildfires in Fort McMurray and resources from the Government of Canada and British Columbia were mobilized. Stakeholders reported that they were satisfied with the process and appreciative of the assistance.

Documents suggested that the use of OFMAR has also fostered efficiency by using provincial resources rather than drawing on federal employees. Stakeholders agree that OFMAR is a useful tool to enhance surge capacity but, due to the timeliness and often complexity of the request, deployments were more likely to be fulfilled through interprovincial bilateral agreements. The OFMAR process provides a mechanism for these bilaterial agreements to take place.

Rapid Response Teams

The Ebola Virus Disease Rapid Response Teams were established by the Agency during the West African outbreak in 2014-15. The Rapid Response Teams were made up of technical experts across six domains (epidemiology, infection prevention and control, communications, emergency preparedness and response, biosafety, and laboratory support). The response teams were engaged in site visits and exercises in all provincial and territorial jurisdictions. Through these engagements, an Agency Rapid Response Team model beyond Ebola was considered by all jurisdictions; however, this model and related protocols have not been pursued (nor have they been required for a response to a public health event). Provincial and territorial stakeholders interviewed for this evaluation expressed a desire to continue working on these models in the future, considering this a best practice for providing expertise where it is needed within each respective jurisdiction during a public health event or emergency.

Microbiological Emergency Response Team

The Microbiological Emergency Response Team (MERT) was formed in 2001 in response to "white powder" events[vii]. The MERT ensures PHAC maintains an appropriate level of preparedness for bioterrorism in Canada. It involves deploying a response team and a mobile level 3 laboratory capable of in-field diagnostics to provide a rapid on-site assessment of potential biological threats. The MERT remains a crucial part of the RCMP-led chemical, biological, radiological, nuclear and explosives team, and is intended to be deployed for pre-planned security events, and in response to potential security concerns, both nationally and internationally. MERT was mobilized to respond to three events between 2012-13 and 2016-17: two times within Canada and once in another country.

[vii] Letters containing anthrax were mailed to organizations and individuals in the United States. Many more hoax envelopes containing benign white powder were reported worldwide.

Enhancing Efficiency Moving Forward: Mobilization Strategy

The Health Portfolio Mobilization Strategy for Event Response seeks to enable management to make informed decisions by advancing a common understanding of the Agency's mandate by improving and enhancing systems, policies and procedures governing mobilizations and by strengthening the Health Portfolio's capacity to recruit, train, and support staff mobilizations in a balanced and strategic manner. The deliverables from this strategy will contribute to a whole-of-portfolio approach to personnel mobilizations for event responses and are expected to be fully implemented by 2018-19.

It is expected that the full implementation of the mobilization strategy will benefit several EPR activities. An increased emphasis on providing and tracking employee training (both within PHAC and Health Canada) may allow for a more diverse surge population to draw from during events. It is expected that this will reduce the burden on those who currently participate, as well as reduce overtime costs.

Support Systems

CEPR, the NML EOC and Regional Operations rely on different emergency management platforms to facilitate planning and response activities. CEPR is developing two new platforms, All-Events Response Operations (AERO) and the Emergency Management System (EMS), to improve the systems it is currently using. For recent activations, CEPR has relied on spreadsheets to prepare rosters for event activation and to track event information. Many key informants reported concerns regarding sharing information in real-time during events with stakeholders in multiple jurisdictions, citing problems with version control. CEPR has also relied on email as a primary means of communication. This concern was compounded by email systems that were, at the time, incompatible with each other, making it difficult to open attachments. This practice also limited the receipt of information when individuals were not available, which would not be the case with the use of EPR-related generic email accounts.

The Laboratory Information Management System (LIMS) is used by NML to help manage all preparedness and response activities, including training and mobilizations, and was a primary source of information for this evaluation. At the same time, this system is linked to other laboratory information necessary to ensure that both people and physical resources (such as laboratory equipment) are available for response. This system is also linked to the regular operations of the NML as a whole.

One of the key tools outlined in the mobilization strategy is the development of the AERO application. This database contains information on Health Portfolio employees who may be selected to respond to public health events and emergencies. CEPR launched AERO in June 2017 across PHAC to collect the information necessary to mobilize staff, track training, and follow responses to emergency activations. AERO has been in development for several years and has been used since September 2015 to track the deployment of epidemiologists. When fully developed, AERO is slated to be deployed across both PHAC and Health Canada. In AERO's current stage, no performance information is available to demonstrate how the database has enhanced efficiency in mobilizations, or has led to changes in emergency

response. However, it is expected that, when fully adopted by CEPR, AERO will facilitate analyzing and reporting of exercise and event-related information through consistent definitions and a central database. Going forward, the implementation of AERO will facilitate the discovery of individuals who are interested and able to serve in the IMS.

Although the recent addition of the Emergency Management System (EMS) has begun to systematically inform CEPR regarding individuals who meet requirements to fill IMS positions, past activations have used less formal processes, such as personal contacts and records from past activations. There are protocols to fill an IMS and current recruitment practices require Health Portfolio response centres to first seek director general approval before reaching out to their directorate's staff. The requested employees are then required to seek approval from their direct manager. Some internal stakeholders noted that this process was circumvented in order to recruit specific people. Program documents suggest that this process slowed the timely filling of positions. Although stakeholders reported that processes to fill the IMS often drew upon the same roster of individuals each time, a review of the information available through the EMS suggests that this may no longer be occurring.

These initiatives are promising and appear to address concerns raised in this evaluation. However, they are in the early stages of full implementation, and thus it is not yet possible to determine their effectiveness. Clarity on the purpose and use of systems to track documentation (AERO, EMS, LIMS), and the specific identification of an authoritative source for the data sought, would speed the gathering and dissemination of information, and ensure a complete picture of the Agency's activities in this area.

Stockpiling of Assets

Stockpiling of assets for health events and emergencies is a responsibility shared between federal, provincial and territorial governments. PHAC provides a surge capacity for the provinces and territories during events and acts upon their request. Requests for assistance can also be made from other countries and international organizations.

To respond to these requests, PHAC maintains the National Emergency Strategic Stockpile (NESS), a federally-owned stockpile of emergency supplies designed to help respond to all types of hazards, and generally deliverable across Canada within 24 hours. Essential assets and medical countermeasures are stockpiled, as per identified requirements, including recent personal protective equipment requirements, as authorized through funding for Ebola. A series of standard operating procedures govern the deployment and management of these assets.

The NESS contains a large inventory of equipment and supplies that are grouped into four categories. Medical equipment and supplies include individual items such as ventilators, personal protective equipment (e.g., masks, gloves), and clinic supplies. Medical countermeasures (e.g. vaccines, antidotes, antibiotic) are stockpiled in the NESS in preparation for the intentional or accidental release of a CBRN agent. Social service supplies include individual items such as generators, cots, blankets, flashlights. Modules, units or kits, are compilations of items such as the most recently developed mini-clinics.

Between 2012-13 and 2016-17, PHAC deployed assets within Canada in response to 75 events and internationally in response to nine events. Events within Canada are most often meteorological or hydrological (34%), or biological (30%). Other types of events are supply disruption (17%), conflict (9%), mass gatherings (8%), and technological (2%). In response to these events, PHAC primarily supplied social service supplies (49%) and pharmaceuticals (39%). Other assets deployed were modules, units or kits (8%) and medical equipment and supplies (4%). Internationally, all events were biological in nature. In response, PHAC primarily supplied pharmaceuticals (70%), medical equipment and supplies (20%) and social service supplies (10%).

Public health medical countermeasure requirements are established through program analysis and consultation with subject matter experts and medical advisors. Medical counter measure requirements are further informed through information sharing with federal partners, provinces and territories and through participation in international fora such as the Medical Countermeasures Consortium. The Agency continues to acquire medical countermeasures on a yearly basis according to both a stockpile management plan and temporal needs. These acquisitions contribute to the protection of the health of Canadians, through vaccinations and/or treatments in the event of an infectious disease outbreak, or the release of a biological or chemical agent.

Detailed information regarding the quantities of medical countermeasures held by the Agency is not available due to the nature of the assets. The deployment of medical countermeasures internationally is assessed on a case-by-case basis, and involves extensive consultation with federal partners who have an international mandate. In the event that a request for assistance is received and international deployment is considered feasible, PHAC would conduct an analysis to consider a number of legal, logistical, domestic risk, and regulatory concerns.

4.5 Performance: Issue #5 – Demonstration of Economy and Efficiency

Observations on Economy

PHAC internal expenditures in the area of emergency preparedness and response would include the activities outlined in this report such as emergency management governance, emergency management plans, exercise and training, operations centres, field mobilizations and the National Emergency Strategic Stockpile. A summary of budgets and expenditures in this area is presented in the table below.

Fiscal planning for emergency preparedness and response activities is difficult due to the variable and unpredictable nature of emergencies. As presented in Table 7, the fiscal year variances ranged from underspending of 16% to overspending of 62%. As noted in public documents, overspending occurred across three years from 2013-16 because funds were

used to support the vaccine fill line project[viii], purchase antivirals and medical countermeasures for the National Antiviral Stockpile and the NESS, as well as to support the Ebola virus outbreak in 2014-15. It should be noted that, although spending for these initiatives was not included in the planning cycle, the Agency sought and received additional funds through Treasury Board Submissions and Memoranda to Cabinet. Underspending in 2016-17 was primarily due to a re-profile of funding for Ebola preparedness and response initiatives, which were no longer needed as originally intended.

Table 7 Variance between Planned Spending vs Expenditure 2012-2013to 2016-2017 ($M)

Year[a]	Planned Spending ($)						Expenditures ($)						Variance ($)	% of Planned spending
	Gs & Cs	O&M	Salary	Capital	Statutory	TOTAL	Gs & Cs	O&M	Salary	Capital	Statutory	TOTAL		
2012-13	1.7	36.1	12.2	0.5	0.0	50.5	0.0	31.9	14.8	0.1	1.7	48.6	2.0	96%
2013-14	0.0	24.0	11.2	0.5	0.0	35.7	0.0	41.5	14.2	0.0	1.9	57.6	-22.0	162%
2014-15	0.0	22.6	13.7	0.5	2.2	38.9	0.0	27.1	15.1	0.2	1.9	44.4	-5.4	114%
2015-16	0.0	26.6	16.9	0.5	0.0	43.9	0.0	32.7	15.2	0.4	2.3	50.6	-6.8	115%
2016-17	0.0	42.7	17.2	0.5	0.0	60.4	0.0	31.7	16.4	0.7	1.8	50.5	9.9	84%

[a] Planned spending data from the Departmental Plan: Public Health Agency of Canada (formerly Report on Plans and Priorities)
[b] Expenditure data found in Departmental Performance Reports
[c] Salary also includes the employee benefit program

[viii] Fill Line: Increasing the filling capacity of Canada's domestic influenza vaccine manufacturing to secure, protect and improve ongoing domestic vaccine production capacity in Canada for both seasonal and pandemic influenza

It is difficult to determine if the resources used to support EPR activities were optimized as expenditures are not disaggregated between preparedness, detection and response activities. Moreover, portions of the cost to respond to an event (e.g., travel, salary) are embedded within other branches because of the process that is used to authorize an employee to serve during an activation. As mentioned earlier, staff from across PHAC and Health Canada are mobilized to support responses to public health events when emergency operations centres are mobilized. Currently, it is the home directorate's responsibility to pay costs associated with salary, overtime, and other mobilization costs (e.g., travel). This creates financial uncertainty for the home directorate, as noted in the mobilization strategy.

Historically, a specific delineation of staff assignment by activation level has been available (e.g., 2009 H1N1 response), which would allow for the assessment of the considerable resources drawn into the HPOC. Records have not been kept in such detail for more recent events.

Stakeholders did note several instances in which PHAC has made attempts to enhance efficiencies.The modernization of the NESS has resulted in the closing of redundant federal warehouses and outdated assets in pre-positioned sites. It is expected that once complete, NESS will close three federal warehouses and 17 federally-leased pre-positioned sites for a cost savings of $600,000, but still be able to maintain 24-hour service delivery targets. Information-sharing efforts across jurisdictions are continually being made to ensure an appropriate complement of supplies, avoid duplication, and coordinate the purchase of new or replacement stocks.

Both the NML and CEPR noted that exercises are planned in conjunction with other program areas, departments, non-governmental organizations, and other countries in order to minimize the need to develop exercises internally.

PHAC seeks to reduce the burden of purchasing or developing medical countermeasures through its participation in the Medical Countermeasures Consortium and by seeking partnerships with other departments (e.g., Department of National Defense) within which purchases can facilitated and prices lowered by requesting larger quantities.

Further Observations on Efficiency

The economic impact of health-related events and emergencies can be substantial. The World Bank has estimated that the worldwide economic loss for six major outbreaks of zoonoses between 1997 and 2009 was more than US$80 billion[25]. The International Working Group of the World Bank suggests that Canada could expect an annual economic loss of $6.9 billion should there be a major pandemic influenza. It is difficult to directly assess the economic impact of PHAC's work in preparing for, and responding to such events. It is also difficult to directly assess the economic impact of any programming changes that may result. Nevertheless, it is clear from stakeholder interviews that work that PHAC undertakes in preparation, detection and response to health-related events limits the impact of these events, and helps protect Canadians from threats to public health.

Governance and Clarity of Roles

Documents reviewed and interviews with external stakeholders suggested there are clear roles and responsibilities between PHAC and other government departments (e.g., Public Safety Canada, RCMP, CBSA) for most EPR activities, and no duplication of effort was noted. However, as there is no formal mechanism to supply assets to other countries, there has been in the past five years, a reliance on support from Global Affairs Canada, who has the mandate to move assets from Canada to other countries. It should be noted that the evaluation did not consult with stakeholders from non-governmental organizations (e.g., Canadian Red Cross, Médecins Sans Frontières Canada), internal stakeholders did not report duplication of effort with these groups.

Within the Health Portfolio, branches within Health Canada and PHAC that work with CEPR reported appreciation for the work that is undertaken and improved clarity of roles, following the implementation of a shared service agreement between the two organizations for the provision of emergency preparedness and response activities, among other shared services such as human resources and information management. There is a governance structure between the two organizations to manage emergency preparedness and response. Some internal stakeholders wondered if this structure was not adequate for decision-making purposes within Health Canada due to limited representation. However, when situations arose where further discussions were required at a senior or broader level, CEPR would hold bilateral discussions to advance issues.

It is unclear if internal processes are being followed to establish governance during activations. Emergency response plans and protocols outline clear processes for activation and deactivation during public health events, but little documentation was available to describe the decision-making process during activations. Documentation could have outlined why certain processes were not followed. An example was the recent HPOC activation to address the opioid crisis, which was led by Health Canada and yet no there no Health Portfolio Executive Group was established as required. According to emergency response plans, this committee is to be established for PHAC-led levels 3 and 4 HPOC activations and Health Canada-led HPOC activations at levels 2, 3 and 4 and is co-chaired by representatives from PHAC (Chief Public Health Officer and/or President) and Health Canada (Deputy Minister). Moreover, some key informants noted the lengthier process of mobilizing Health Canada colleagues (specifically in the regions) during a public health event, although this may be mitigated in part by the mobilization strategy.

Observations on the Adequacy and Use of Performance Measurement Data

The Centre for Emergency Preparedness and Response (CEPR) has recently developed a performance information profile (and had previously developed a performance measurement strategy) that details the program's activities and what is expected to change as a result of these activities. Although data sources have been identified, most of these data sources were not ready for use, or data was not collected in a manner that facilitated its use by the program to guide activities. Extensive effort was required by the evaluation team to compile and assess performance against these indicators.

However, CEPR participates in a continual improvement process by examining lessons-learned following events and exercises. Although this activity does not measure against the programs' expected results, it can serve as a proxy in many cases. For example, although there is limited information available to determine the "percentage of critical or key information provided to programs and management within defined timelines", the lessons-learned process has identified several recommendations to improve information management and dissemination to senior management.

Canada's level of compliance with the *International Health Regulations* (IHR) is assessed annually and this measure is the indicator for CEPR's contribution to protecting Canadians from threats to public health. CEPR plans activities to ensure that health capacity requirements identified in the IHRs are met at the highest possible level. Starting in 2017-18, Canada's implementation of the IHR will be supported by a systematic, multi-sectoral evaluation of the technical areas using a Joint External Evaluation process, which will take place on a five-year cycle. Although closely aligned with the IHR, this process includes both a self-assessment and a review by an external evaluation team with experts in the relevant domains. Information provided through the source will serve as useful performance measurement and evaluative information in the future.

5.0 Conclusions

Relevance

There is a need for the Health Portfolio to maintain and enhance emergency preparedness and response activities, based on the ever-evolving risk landscape of threats to Canadians' health and considering factors such as globalization and climate change. Public health events are occurring more frequently and their impact is intensifying due to increased urbanization, infrastructure dependencies and movement of goods and people.

Emergency preparedness and response is a core federal government responsibility clearly articulated in several key documents, such as the *Emergency Management Act* and the *Federal Policy for Emergency Management*. Activities also align broadly with key Government of Canada priorities. In the Health Portfolio, PHAC is responsible for providing the majority of services that fulfill an emergency preparedness and response (EPR) role.

Key informants reported clarified roles and responsibilities as a result of PHAC assuming responsibility for the shared service EPR function for PHAC and Health Canada. However, a review of lessons learned documents and interviews with internal stakeholders indicated some confusion regarding who within the organization should be undertaking specific tasks.

Furthermore, there have been enduring questions regarding the Health Portfolio's continued role in responding to emergency social service events (such as assisting in response to wildfires) and international events (events that take place outside Canada with limited immediate domestic implications). PHAC continues to play a role in these areas, in some form or another, despite the substantial contribution of non-governmental organizations (e.g.,

Canadian Red Cross, *Médecins Sans Frontières Canada)* and unclear international program authorities.

Performance

PHAC's emergency operations centres have been in a recurrent state of activation in response to 24 discrete events over the evaluation period. The Health Portfolio Operations Centre (HPOC) was activated for 10 events for a total of 1,067 days of emergency response, which varied in both duration and intensity of required effort. Often, the operations centres at the NML and in the regions were activated for the same events as the HPOC; however, they were also activated for events specific to their area of concern. Partners (provinces and territories, as well as other government departments) have voiced their appreciation for this level of effort and support when preparing for and responding to public health events and emergencies. They were generally satisfied with the Agency's performance in this area.

The Centre for Emergency Preparedness and Response (CEPR), as the coordinating centre for emergency management activities, is aware that a necessary focus on event response has impacted progress in areas of response preparedness. Surge capacity to respond to extended or multiple events continues to be of great concern to both internal and external key informants, including the scaling-up at the start of the event as well as areas of public health concern that may arise after the initial event. Information flow deficiencies (e.g., disparate email platforms, paper-based systems, activities tracked through spreadsheets) hindered staff responding to events, particularly those in the regions, both before and during a response. Limited documentation on events has been collected and maintained for performance measurement and lessons learned reviews. Finally, event reviews have not been conducted in a timely fashion, limiting the impact of lessons learned by relevant programs to improve preparedness and response activities.

CEPR is aware of these challenges and has developed plans to enhance preparedness and response activities. The implementation of these plans should ensure a more effective and efficient response to public health events in the future.

Recommendations

Recommendation 1: Promote a whole of Portfolio[ix] engagement approach to support emergency preparedness and response.

Large or protracted events require the mobilization of many employees to serve in an incident management structure and at times in field mobilizations. The evaluation noted that there were no issues raised regarding the Agency's capacity to mobilize sufficient numbers of employees to support previous long and frequent activations; however, there were concerns that mobilized employees could burn out and event responses would suffer should this pattern of activation continue. This was one of the key risks identified in PHAC's Corporate Risk Profile.

Emergency preparedness is a part of the Agency's core foundational mandate. Developing and reinforcing this understanding among staff and management will facilitate mobilizations by enlarging the roster of employees prepared for them. Managerial obstacles may also be overcome by supporting management who operate with a reduced staff complement as a result of mobilization, or by reviewing corporate priorities through a coordinated process during intense activations.

Recommendation 2: Implement the mobilization strategy.

PHAC has recognized the need to broaden the pool of appropriately skilled employees available to serve during responses, considering the potential for multiple and prolonged events and emergencies, and has undertaken considerable work to develop a strategy to address this.

Implementation of a mobilization strategy is in early stages; however, it is expected that a fully implemented strategy will help develop a more diverse roster of individuals to serve in an Incident Management Structure (IMS) and field mobilizations. It will also help identify individuals with the required skills, training and certifications to serve in specific functions (e.g., laboratory, procurement, policy, emergency management, public health, border health, epidemiologists) and focus on these groups of individuals. Furthermore, it will ensure that staff who are willing to be mobilized are adequately trained prior to deployment, should an event or emergency arise.

[ix] For the purposes of this evaluation the Health Portfolio is limited to PHAC and Health Canada.

Recommendation 3: Review relevant plans, protocols and governance documents to ensure clarity in roles and feasibility of responsibilities for emergency preparedness functions.

Emergency preparedness activities are supported by several governance and planning documents (Health Portfolio Strategic Emergency Management Plan, Health Portfolio Emergency Response Plan, Health Portfolio Concept of Operations, Lessons Learned Plan, and Training Plan). Decisions regarding preparedness planning and event response are made according to these established protocols; however, the evaluation noted that documentation regarding these decisions was not readily available.

As the coordinating lead for emergency preparedness and response activities within the Health Portfolio, the Centre for Emergency Preparedness and Response should consider reviewing these documents to ensure the data collection requirements are feasible and that they clearly articulate the point of responsibility for the collection and maintenance of information to be captured, including activation, deactivation and other decision points, and to whom and in what forum this information should be shared.

Recommendation 4: Implement and maintain an All-Hazards Risk and Capability Assessment process.

Risk-based evidence is crucial for timely, effective decision-making and appropriate resource allocation. The Agency's emergency planning activities currently reflect a risk assessment model that is dated and does not include an understanding of the capabilities of the Agency or others who respond to health events and emergencies (e.g., provincial and territorial governments, other government departments, non-governmental organizations).

An updated and completed All-Hazards Risk and Capability Assessment would support several critical emergency preparedness and response activities (e.g., continued modernisation of the National Emergency Strategic Stockpile, timely acquisition of specialized medical countermeasures, development of just-in-time technical training programs, enhancement of provincial relations). Although there has been some progress toward an All-Hazards Risk and Capability Assessment, it is behind schedule. The Centre for Emergency Preparedness and Response should ensure that the process to develop the All-Hazards Risk and Capability Assessment is feasible and that assessments for both risk and capability are undertaken in a timely fashion and updated appropriately.

Recommendation 5: Ensure lessons-learned reviews for Health Portfolio-related events and exercises are undertaken in a timely fashion and proportionate to the complexity and size of the public health event or exercise.

Continuous improvement is a fundamental principle and key component of efficient and effective emergency management. The lessons learned approach is standard for emergency preparedness and response activities; however, the evaluation found inconsistencies in the collection, analysis and reporting of lessons learned following exercises and events, leading to similar shortcomings being experienced across multiple activations. Furthermore, when completed, the findings and recommendations were neither broadly shared, nor approved at the appropriate level for strategic consideration.

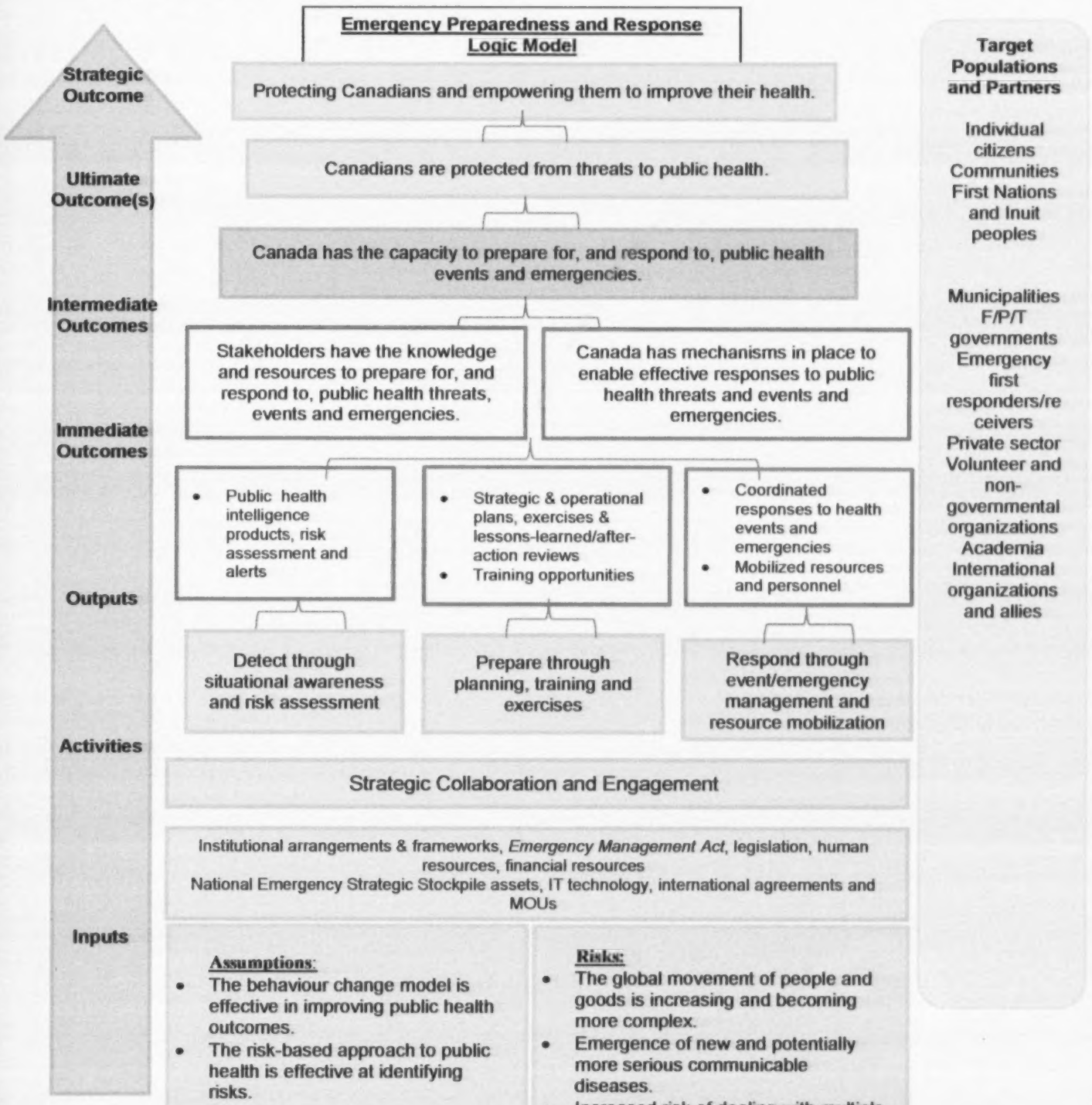
The Centre for Emergency Preparedness and Response has recently developed a revised, comprehensive process that should guide future lessons-learned activities. This process should be reviewed to ensure that it can be implemented as planned, that, when appropriate, it takes into consideration lessons learned from the National Microbiological Laboratory Emergency Operations Centre and Regional Emergency Coordination Centres, and that results are communicated broadly.

Recommendation 6: Ensure that the purpose of the IM and IT platforms is clear and addresses current and anticipated needs.

There are currently three information management platforms (the All-Events Response Operations application, the Laboratory Information Management System, and the Emergency Management System) used within PHAC to support the emergency preparedness and response function. Each platform is independent, but similar information is collected by all three systems. This duplication presents complications when seeking an authoritative source of data for planning and reporting purposes. Although some duplicate information is collected, key informants indicated that these platforms have the capacity to perform unique functions.

PHAC should review platform requirements, both current and anticipated, and implement these with a clear understanding of their purpose, how these systems will be synchronized and which system will serve as the authoritative source for reporting purposes for each identified requirement.

Appendix 1 – Logic Model


Emergency Preparedness and Response Logic Model
Strategic Outcome
Protecting Canadians and empowering them to improve their health.
Ultimate Outcome(s)
Canadians are protected from threats to public health.
Intermediate Outcomes
Canada has the capacity to prepare for, and respond to, public health events and emergencies.
Immediate Outcomes
Stakeholders have the knowledge and resources to prepare for, and respond to, public health threats, events and emergencies.
Canada has mechanisms in place to enable effective responses to public health threats and events and emergencies.
Outputs
Public health intelligence products, risk assessment and alerts
Strategic & operational plans, exercises & lessons-learned/after-action reviews
Training opportunities
Coordinated responses to health events and emergencies
Mobilized resources and personnel
Activities
Detect through situational awareness and risk assessment
Prepare through planning, training and exercises
Respond through event/emergency management and resource mobilization
Strategic Collaboration and Engagement
Inputs
Institutional arrangements & frameworks, Emergency Management Act, legislation, human resources, financial resources
National Emergency Strategic Stockpile assets, IT technology, international agreements and MOUs
Assumptions:
The behaviour change model is effective in improving public health outcomes.
The risk-based approach to public health is effective at identifying risks.
Risks:
The global movement of people and goods is increasing and becoming more complex.
Emergence of new and potentially more serious communicable diseases.
Increased risk of dealing with multiple emergencies and events simultaneously.
Target Populations and Partners
Individual citizens
Communities
First Nations and Inuit peoples
Municipalities
F/P/T governments
Emergency first responders/receivers
Private sector
Volunteer and non-governmental organizations
Academia
International organizations and allies

Appendix 2 – Evaluation Description

Evaluation Scope

The scope of the evaluation covered the period from April 1, 2012 to March 31, 2017, and included most of the Public Health Agency of Canada's emergency management activities. It did not cover the technical expertise required to respond to events.

The evaluation issues were aligned with the Treasury Board of Canada's *Policy on Results* (2016) and considered the five core issues under the two themes of relevance and performance, as shown in table 1. Corresponding to each of the core issues, specific questions were developed based on program considerations and these guided the evaluation process.

Table 1: Core Evaluation Issues and Questions

Core Issues	Evaluation Questions
Relevance	
Issue #1: Continued Need for Program	• Do program activities address current and emerging needs in the area of emergency preparedness and response?
Issue #2: Alignment with Government Priorities	• To what extent does the program align with federal and PHAC roles and responsibilities?
Issue #3: Alignment with Federal Roles and Responsibilities	• To what extent do the program objectives align with federal priorities? • To what extent do the program objectives align with and contribute to the strategic outcomes of PHAC? • Does the federal public health role and current activities duplicate the role of stakeholders? Are there any gaps or overlaps? • To what extent does the program focus on the critical roles and functions of emergency preparedness and response and have these changed over time? Are there current activities that are no longer needed? • Is there a common understanding of the shared services role that PHAC provides in this area?
Performance (effectiveness, economy and efficiency)	

Table 1: Core Evaluation Issues and Questions

Core Issues	Evaluation Questions
Issue #4: Achievement of Expected Outcomes (Effectiveness)	• To what extent do stakeholders have the knowledge and resources to prepare for, and respond to, public health threats, events, and emergencies? • To what extent does Canada have mechanisms in place to enable effective responses to public health threats, events, and emergencies? • To what extent does Canada have the capacity to prepare for, and respond to, public health events and emergencies? • To what extent are Canadians protected from threats to public health?
Issue #5: Demonstration of Economy and Efficiency	• Has the program undertaken its activities (NESS, HPOC, Field Mobilizations, Exercises and Governance) in the most efficient manner? Are there viable alternatives to these activities? • Has PHAC achieved its outcomes in the most economical manner? • Are there appropriate performance measurements in place? If so, is the resulting information being used to inform senior management decision-makers?

An outcome-based approach was used by this evaluation to assess the progress made towards the achievement of the expected outcomes, whether there were any unintended consequences, and what lessons were learned.

Data Collection and Analysis Methods

Evaluators collected and analyzed data from multiple sources. Data collection started in January 2017 and ended in June 2017. Data for the evaluation was collected using the following methods:

- Document review – approximately 35 documents pertinent to emergency preparedness and response were reviewed for information regarding the relevance (priorities, roles and responsibilities) of the activities.
- File/performance data review – approximately 150 documents, held by the divisions responsible for emergency preparedness and response activities, were reviewed to obtain information regarding all aspects of the activities related to emergency

preparedness and response and in particular the performance (achievement of outcomes, economy and efficiency) of activities.

- Financial data review – a review of financial data from 2012-13 to 2016-17 was conducted, including planned and actual spending.
- Key informant interviews – interviews were conducted with 55 stakeholders; staff and management internal to CEPR (n=8); stakeholders external to CEPR but within the Health Portfolio (n=22) and stakeholders external to the Health Portfolio (n=25) including: other federal government departments, and provincial and territorial representatives. Key informants were selected for their knowledge of, and experience with, emergency preparedness and response at PHAC or issues related to emergency preparedness and response.

Data were analyzed by triangulating information gathered from the different methods listed above. The use of multiple lines of evidence and triangulation were intended to increase the reliability and credibility of the evaluation findings and conclusions.

Annex 1 – Exercises by activation centre

	Activated Centre		
Exercises	**HPOC**	**RECC**	**NML EOC**
2012-13			
Frontier Sentinel	-	X	-
Spring Cleaning	-	-	X
Triple Bypass	-	-	X
Huron Challenge	X	X	-
CAPEX	-	-	X
2013-14			
Regional Exercise	-	-	X
Spring Cleaning	-	-	X
Firedrake	-	-	X
Cool Breeze	-	X	-
CPX	X	-	-
Youthful Spirit	-	X	-
2014-15			
Triple Bypass	-	-	X
Unified Response	X	X	-
Firedrake	-	-	X
2015-16			
CAPEX 15	-	-	X
Regional	-	-	X
Spring Cleaning	-	-	X
Celebratory Spirit	-	X	-
Sat Telcom	-	X	-
Internal Exercise (MB/SK)	-	X	-
Retour au Bercail	-	X	-
Vigilance	-	X	-
Intrepid	-	X	-
Validex	-	X	-
Quadruple Bypass	-	-	X
BC Nuclear Ex	-	X	-
2016-17			
Spring Cleaning	-	-	X
Super Ex	-	-	X
Pacific Quake	-	X	-
Huron Resolve	-	X	-
Collaborative Care	-	-	X
Microbial Forensics	-	-	X
Total	3	15	16

Year	Exercise	Description
Annually 2012 - 2016	Operation Nanook	Federal/Territorial exercises conducted on an annual basis by the Canadian Forces in support of the Canadian Government's Arctic Policy and Northern Strategy
2012	Novellus	Health Portfolio tabletop exercise on the Novel Coronavirus, to map out existing plans, protocols, and ad hoc arrangements along with associated gaps.
2012	North American Plan for Animal and Pandemic Influenza (NAPAPI)	International/Federal level tabletop exercise focused on the engagement of the Senior Coordinating Body when animal or pandemic influenza impacts North America.
2012	CMOHs and CVO Workshop	Federal/Provincial/Territorial exercise to engage the Chief Medical Officers of Health (CMOH) and the Chief Veterinarian Officers (CVO) in an open dialogue to find a solution to a disease outbreak.
2013 - 2014	Validex Exercise Series	Federal/Provincial/Municipal governments and local emergency response partner multi-lateral exercise program to improve nuclear emergency preparedness and response.
2013	Self-guided exercise for First Nations to enhance their pandemic preparedness	An emergency manager tabletop exercise to help prepare communities for an infectious disease emergency.
2014	Sudden Onset	A focused discussion among Federal/Provincial/Territorial partners to map out existing plans, protocols, procedures, and ad hoc arrangements in the event of an Ebola case in Canada
2014 - 2015	Exercise Youthful Spirit and Exercise Celebratory Spirit	Federal/Provincial/Municipal exercises to validate specific operational level activities, tools, procedures, and responses to incidents that could impact the Health Portfolio during the Pan/ParaPan Am Games 2015.

2015	Beyond the Borders (BTB) cross border mutual aid	Seminar and workshop involving PHAC, Health Canada, Public Safety Canada, DND, and the U.S. Departments of Homeland Security, Health and Social Services, and Defense to explore existing mechanisms for information exchange, gaps, and opportunities for improvement.
2015	Intrepid	A Federal/Provincial exercise with regional health authorities, municipalities, industry and technical subject matter experts, based around a 'Site Area Radiation Emergency' at the Point Lepreau nuclear generating power station in New Brunswick.
2016	Exercise Pacific Quake 2016	A Federal/Provincial functional exercise with regional health authorities and municipalities, intended to test federal institutional abilities to jointly respond to an earthquake along the Cascadia fault line.
2016	Huron Resolve	A Canadian nuclear exercise with partners from the province, the Health Portfolio, CNSC, the Federal Exercise Working Group and RNEMCC

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